INSTITUTION NOTES

October, 1941

Fixtures

November 5, 1941—Cornish Section, 7-15 p.m., Camborne. Three Short Papers, "A.R.P. in Industry," by P. Tromans (Member); "Designing for Production," by F. Coombes (Associate Member); and "Press Tools," by N. Daglish (Associate Member).

November 6, 1941—Annual General Meeting, London, 11-30 a.m., followed by Extraordinary General Meeting to consider revisions, in Articles of Association.

Meeting of the Council

The Council met in London on September 26, 1941, Mr. Kipping, Chairman, presiding, supported by the President, Mr. G. E. Bailey, C.B.E. Other members present were: Major T. M. Barlow, Dr. H. Schofield, M.B.E., Messrs. J. W. Berry, J. H. Bingham, J. E. Blackshaw, R. Broomhead, D. Burgess, W. F. Dormer, H. A. Drane, E. P. Edwards, R. C. Fenton, H. J. Gibbons, J. R. Gimson, G. H. Hales, F. W. Halliwell, E. W. Hancock, M.B.E., J. A. Hannay, H. A. Hartley, B. C. Jenkins, E. J. H. Jones, J. T. Kenworthy, W. Puckey, R. D. G. Ryder, J. D. Scaife, A. Sykes and F. Williams. Also present: Messrs. A. E. Newby (Councillor-elect); A. W. Buckland, F. W. Cranmer and F. C. White, (Section Hon. Secretaries; R. Hazleton (General Secretary), 2nd Lieut. W. S. Marsden (Assistant General Secretary) and Miss E. C. Larbalestier (Office Manager).

Revised Conditions for Election to Associate Grade

The Council at its meeting on September 26th, unanimously approved a proposal to substitute for the existing wording of No. 16 of the Articles of Association the following wording:

16.—"Candidates for admission as Associates must be persons, not under twenty-eight years of age, who, not being production engineers, have held for a sufficient length of time positions of authority involving responsibility for executive management or control of any function pertaining to production other than production engineering, or who are otherwise considered eligible for election as Associates by the Council."

The subscription payable by Associates is in future to be £2 instead of £2 10s, provided the proposed alterations are adopted at the Extraordinary General Meeting on November 6th, notices for which were issued on October 16, 1941.

(For full particulars of the reasons for the proposed changes, see *The Technical Bulletin*, No. 5, October, 1941).

Substitute Graduateship Examinations: List of Passes.

C. BELL
A. BOWERY
S. COLEMAN
E. CONSTABLE
A. DEELEY
A. FIDLER
K. GREEN
L. HACKNEY
J. HALLDRON
P. HODGE
E. JONES
J. KELSH
M. PAGE
J. PARKER
J. QUINN
J. WOOD
C. WOLLASTON

8th October, 1941. R. HAZLETON, *General Secretary*

Newly Elected Members

(*Note.—It has been decided not to publish, during the continuance of the war, the names and locations of Firms to which members are attached*).

As Honorary Member:

Commander Sir CHARLES CRAVEN, O.B.E., R.N.

As Members:

W. ANDERSON
R. DE REYGHERE
G. E. FRANCE
W. E. H. JONES
P. NOBLE
T. G. SPENCER
R. S. CAMPBELL
F. DUNN
W. C. HOLDEN
P. H. MUIRHEAD
H. NUTTON
I. K. THOM
A. CHILTON
T. FARRAR
R. E. JAMES
C. S. NOBLE
W. SUTHERLAND

As Associate Members:

A. V. ALLDAY
H. E. CHIPPERFIELD
T. A. CLARKE
M. C. EDSALL
E. GARLICK
W. HOLTHAM
I. F. E. HOLLINS
F. J. BEESLEY
J. F. COSTER
F. C. DRAKE
T. FEATHER
L. GRIFFIN
C. T. HOBSON
S. O. HICKS
W. R. CHAMPION
J. E. COPP
D. DUDFIELD
M. FISHER
S. G. HAITHWAITE
H. L. HEALY
S. W. LOUGH

As Associate Members—continued.

H. W. MATTHEWS, C. H. G. PRYOR, A. POSPISIL, W. S. POWEL, T. G. SEED, H. M. SCHOFIELD, J. V. STEELE, S. STANNERS, L. WALKER, R. G. WILLIAMS, M. F. WILKINS, T. C. WINMILL

As Intermediate Associate Members:

L. E. BARKER, C. H. CHINERY, F. A. CAVEY, W. G. DAVIS, B. GREATHEAD, S. J. HOLMES, W. H. HOOPER, D. G. INDGE, F. L. JENKIN, W. L. JACKSON, F. W. JOHNS, G. C. S. SEYMOUR, A. THOMPSON, H. A. TURNER, F. C. TOWNSEND, A. H. L. TRAPNELL, H. B. WOOD, M. T. WILKINSON, G. F. HYLAND, P. K. LEONG, M. A. MACKENZIE, H. SAXBY

As Graduates

E. CATLING, J. M. CHANDLER, J. N. EADY, F. GREENHALGH, K. W. OSBORNE, G. POOL, T. PUNWANI, G. RASBERRY, R. M. REAY, J. E. SHAPLEY, J. H. TOMES

As Students:

S. W. W. CARROLL, R. COOPER, K. F. DORMER, J. F. G. TADMAN, F. TILSTONE, J. THOMSON

As Affiliated Firms:

PAPYRUS ENGINEERING CO. LTD.
THE SPERRY GYROSCOPE CO. LTD.
ISAIAH PLATT, LTD.

Transfers

From Associate Member to Member:

C. H. BACON, S. BOWER, R. KIRCHNER, A. L. STUCHBERY

Fron Intermediate Associate Member to Associate Member:

L. G. BURNARD, A. C. PIKE, R. G. WINTON, F. KOENIGSBERGER

From Graduate to Associate Member:

V. A. A. HOLMES, H. SHAW

From Graduate to Intermediate Associate Member :

J. CHERRY G. H. I. CORNWELL R. W. EDWARDS
N. E. LANGDALE T. H. PACKWOOD J. D. SMITH
F. D. H. RONALD

Subscriptions Received for Research

Since the list in last month's *Notes*, the following subscriptions for the Research Department have been received :

Humber, Ltd.	£50
E. Pryor and Sons Ltd.	£20

Mr. Bevin's Speech at the Institution Luncheon

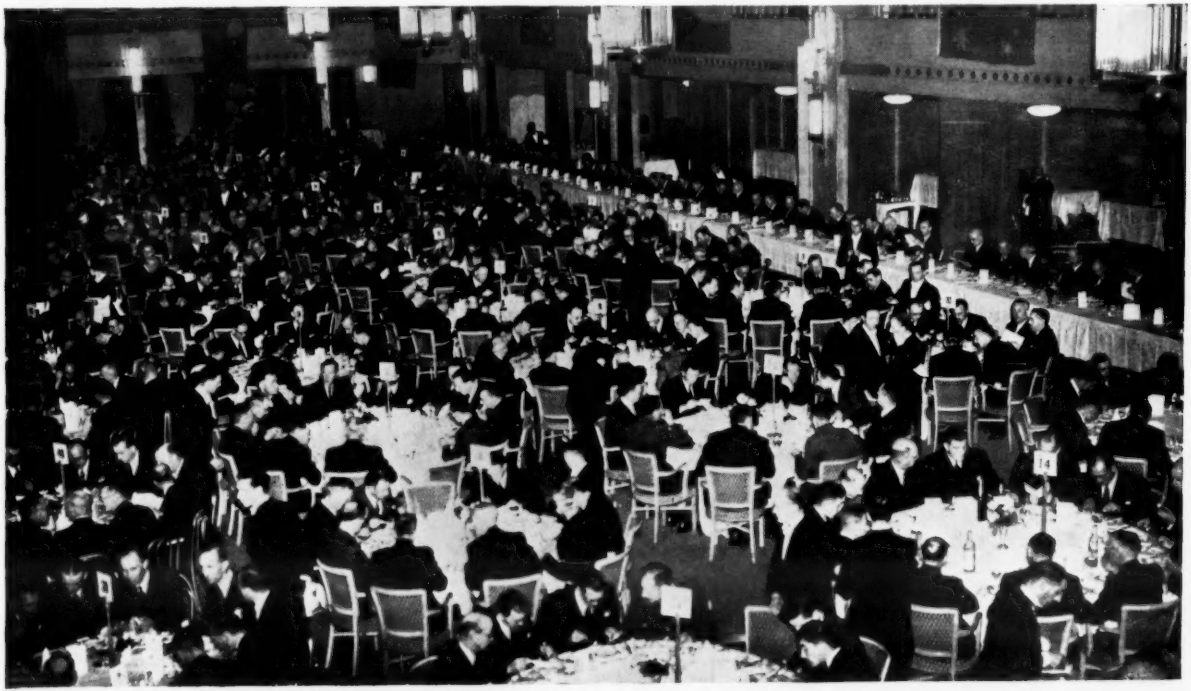
A pamphlet containing a full report of Mr. Bevin's speech at our Annual Luncheon on September 26, 1941, has been published by the Institution. Orders already received for this pamphlet have necessitated the printing of a first edition of seventy-seven thousand copies.

Special Meeting of the Council

A Special Meeting of the Council was held at Birmingham on Saturday, October 18, 1941, to consider the development of the Institution's war effort. Announcements on the subject will be made to members as soon as possible.

Personal

Mr. B. C. Jenkins (Member of Council) has relinquished his post as Chief Inspector of Munitions Labour Supply, Ministry of Labour and National Service, in order to take up an important position in industry.



INSTITUTION LUNCHEON, LONDON, SEPTEMBER 26th, 1941.

Vice-Admiral Sir Bruce Fraser, K.B.E., C.B.; Mr. Ernest Bevin, P.C., M.P.; Mr. G. E. Bailey, C.B.E.
INSTITUTION LUNCHEON, LONDON, SEPTEMBER 26th, 1941.

INSTITUTION LUNCHEON

THE 1941 Institution Luncheon was held at Grosvenor House, Park Lane, London, on Friday September 26th, 1941, at which Mr. G. E. Bailey, C.B.E., President of the Institution, occupied the chair. Nearly eight hundred members and guests were present.

On THE PRESIDENT'S right were :

THE RT. HON. ERNEST BEVIN, P.C., M.P., (*Minister of Labour and National Service*), VICE-ADMIRAL SIR BRUCE FRASER, K.B.E., C.B., (*Third Sea Lord and Controller of the Navy*)., MAJOR J. S. BUCHANAN, C.B.E., (*Dir. Gen., Aircraft Production, M.A.P.*), SIR CHARLES N. MCLAREN, K.C.B., (*Dir. Gen., Ordance Factories, Supply Council*), MR. G. TOMLINSON, M.P., (*Joint Parliamentary Secretary, Ministry of Labour and National Service*), LIEUT.-GEN. SIR WILFRED LINDSELL, K.B.E., D.S.O., M.C., (*Senior Military Adviser, Supply Council*), MR. GEORGE USHER, (*Dir. Gen., Tank Supply, Supply Council*), MR. J. D. SCAIFE,† (*Past-President*), MR. P. H. MILLS, (*Contr. Gen., Machine Tools, Ministry of Supply*), MR. GRAHAM CUNNINGHAM, LL.D., (*Dir. Gen., Production Services, Supply Council*), MR. W. A. STANIER, (*President, Institution of Mechanical Engineers*), MR. TOM THORNYCROFT, (*Past-President*), MR. R. W. WHARHIRST, (*Director, Naval Armament Supply, The Admiralty*), MAJOR G. P. BULMAN, C.B., (*Dep. Dir., Gen., Engine Devel. Production, M.A.P.*), M. C. J. BARTLETT, (*Managing Director, Vauxhall Motors, Ltd.*), MR. W. C. LUSK, (*Chairman, British Thomson-Houston Co. Ltd.*), MR. H. M. AINSWORTH (*Contr., Tank Development, Ministry of Supply*), MR. GRIFFITH BREWER, (*President, Royal Aeronautical Society*), MR. C. J. STEWART, O.B.E., (*Dir. Gen., Production Aircraft Equipment, M.A.P.*), MR. A. W. GARRETT, (*Chief Inspector of Factories*), DR. W. ABBOTT, B.SC., (*H.M.I., Board of Education*).

On THE PRESIDENT'S left were :

COMMANDER SIR CHARLES CRAVEN, O.B.E., R.N., (*Controller General, Ministry of Aircraft Production*), THE RT. HON. LORD HANKEY, G.C.B., G.C.M.G., LL.D., D.C.L., (*Paymaster General ; Chairman, Engineering Advisory Committee*), †MR. N. V. KIPPING, J.P., (*Chair-*

* Means Vice-President of the Institution.
† Means Member of Council:

man of Council of the Institution), MR. HAROLD MACMILLAN, M.P., (*Parliamentary Secretary, Ministry of Supply*), ENG. VICE-ADMIRAL SIR HAROLD BROWN, G.B.E., K.C.B., (*Contr. Gen., Munitions Production, Supply Council*), THE VISCOUNT NUFFIELD, G.B.E., F.R.S., M.A., D.C.L., LL.D., (*Immediate Past-President*†), MR. H. V. TEWSON, (*Assistant General Secretary, Trades Union Congress*), SIR LEOPOLD H. SAVILE, K.C.B., (*President, Insititution of Civil Engineers*), MR. R. ASSHETON, M.P., (*Parliamentary Secretary, Ministry of Labour and Nat. Service*), MR. J. S. PRINGLE, C.B., (*Chief Electrical Engineer to the Navy*), SIR FELIX POLE, (*Chairman, Associated Electrical Industries*), MR. J. R. BEARD, (*President, Institution of Electrical Engineers*), LORD DUDLEY GORDON, (*President, Federation of British Industries*), SIR WILLIAM T. WILSON, (*Dir. Gen., Equipment and Stores, Supply Council*), MR. G. H. NELSON, (*Chairman, English Electric Co. Ltd.*), MR. PERCY C. KIDNER, (*President, Institution of Automobile Engineers*), SIR FRANK GILL, K.C.M.G., (*Chairman, Standard Telephones and Cables, Ltd.*), SIR FRANK N. TRIBE, K.B.E., C.B., (*Deputy Secretary, Ministry of Labour and Nat. Service*), SIR ALEXANDER RAMSAY, (*Engineering and Allied Employers' National Federation*), MR. G. H. INCE, C.B., (*Dir. Gen., Man Power, Min. of Labour and National Service*), MR. A. EWING, (*Chairman, Climax Rock Drill and Engineering Works*), MR. SIMON MARKS, (*Vice-Chairman, London and South Eastern Regional Board*).

In addition to the above, the names of the following members and guests appeared on the list of attendances. (The names of official Institution guests, except where these were members holding Government positions, are printed in CAPITALS).

C. Ackerley, Sir A. Aikman, C.I.E., A. H. Albu, C. E. ALLEN, (*Machinery*), F. Allen, F. J. Allen, W. W. Andrews, A. W. ANGUS, (*Dir., Instrument Production, Min. of Supply*), C. H. APPLEBY, F.C.A., E. A. Appleby, J. E. Apted, C. Arnold, G. Ashworth, P. Attwood, L. Austin, L. F. Ayland, C. W. Baker, L. R. Baker, N. Baliol Scott, F. Bannister, Wing Commander F. R. BANKS, (*Dir., Production and Development, Engine Accessories. M.A.P.*), G. W. Barclay, R. J. Barclay, R. Barlow, *Major T. M. Barlow, T. Barnard, H. Barnes, W. Barnes, W. Barr, R. L. Barrett, R. W. Barrett, J. L. Barton, F. Bates, H. Baume, E. Bausor, H. J. Bavington, T. E. Beacham, L. A. Beadle, E. A. Beale, C. A. Beck, W. R. Bedford, Col. L. C. Bell, M.C., A. Benstead, †J. W. Berry, G. W. Betteridge, †J. H. Bingham, S. A. Binns, A. J. J. Black, R. Black, *J. E. Blackshaw, J. W. Blackshaw, J. C. BLAIR, (*Contr. Machine Tools, Min. of Supply*), H. G. Bloss, H. P. Bloxam, W. Bluemel, W. W. Bode, H. Bolsover, A. E. N. Bolton, S. R. Bonney, F. H. Booth, S. Bottams, D. B. Bowen, H. W. Bowen, H. Bowley, H. F. Box, Capt, B. J. Brady, A. J. Brain, A. L. J. Brain, H. Brent, W. Brett, S. H. Brewell, C. V. BREWSTER, (*Dir., Cutting Tools*,

Min. of Supply)., M. H. Bridge, Capt. J. C. BRIGGS, (*Dep. Dir., Sub-Contracting, M.A.P.*), R. Broadbent, W. Broadbent, H. S. Broom, E. B. Broome, L. E. Broome, *R. Broomhead, A. J. S. Brown, L. H. Brown, T. BROWN, (*Dir., Production, Machine Tools, Min. of Supply*), J. W. Buchanan, Major F. C. Buck, J. G. Buck A. W. Buckland, O. V. S. BULLEID, (*President, Institution of Locomotive Engineers*), S. W. A. Bunker, *D. Burgess, W. E. Buskard, A. L. Butcher, *J. W. Butler, Major-General St. J. D. A. BUTLER, (*Dep. Dir.-Gen. Signals Equipment, Min. of Supply*), A. Butterworth, G. M. Campbell, W. Cannell, E. Carnegie, SIR F. CARNEGIE, (*Chief Superintendent, Ordnance Factories, Min. of Supply*), C. Carnell, A. J. Carratt, A. Carrick-Smith, J. CARTER, (*President, British Engineers' Association*), Sub.-Lieut. S. Caselton, L. Castlemain, N. Catmur, T. S. Catmur, S. R. CAUTHERY, (*Dir. Aircraft Equip. Production and Liaison, M.A.P.*), H. A. Chambers, T. S. CHEGWIDDEN, (*Under-Secretary, Ministry of Labour and Nat. Service*), C. A. Cheyne, Major C. H. Chichester-Smith, D.S.C., W. Christy, I. W. CHUBB, (*The Machinist*), T. A. Clapham, W. A. Clapham, C. Clarke, G. W. Clarke, W. F. Clarke, F. H. Clarkson, A. M. Cleveland, H. E. Coldworthy, J. P. D. Coleman, C. R. Collison, J. Colton, J. C. Condon, R. F. Cook, P. A. COOKE, O.B.E., M.C., (*Dir., Instrument Production, M.A.P.*), A. H. Copeland, F. A. COPP, (*Secretary, London and South Eastern Regional Board*), J. Corbett, W. Core, W. Cornell, H. Cottam, C. B. COWLEY, (*Dir. Tanks Supply, Min. of Supply*), M. Crabbe, P. G Crabbe, T. S. Crabtree, C. L. Craiger, F. W. Cranmer, Major-General CRAWFORD, (*Dep. Dir.-Gen., Tanks Supply, Min. of Supply*), Major I. F. F. Crawford, J. H. Crawford, S. Crawford, H. J. Creffield, L. H. Cresswell, P. S. Crooke, J. H. Crossley, J. F. Crowley, D.SC., J. D. CROZIER, (*Dir. Tank Supply, Min. of Supply*), N. A. Cullin, W. H. Cummings, S. Cunning, W. Custance, F. L. Daniels, J. S. Daniels, Col. M. O. Darby, O.B.E., N. B. Dauncey, A. T. Davey, D. J. Davies, E. Davies, Lieut.-Col. R. A. Davis, M.B.E., A. V. Dawson, W. R. Degenhardt, J. de Jong, Capt. Denness, C. Dennis, A. L. Dennison, H. W. Denny, E. De Waele, W. E. Dilke, H. Ditheridge, G. Dixon, W. Dixon, †W. F. Dormer, D. A. C. Dougal, A. G. Dowding, †H. A. Drane, F. C. Draper, P. Driver, B. Du Hennesey, R. A. Duncan, A. W. Dunn, B. G. Dyer, C. L. DYER, (*Dir. Tank Supply, Min. of Supply*). B. H. Dyson, E. J. Earnshaw, C. East, J. C. Eastes, †E. P. Edwards, W. Elliot, S. R. Elliott, P.R. Elsdon, Lieut,-Commander C. R. F. Engelbach, A. C. England, E. C. Gordon England, A. G. Engwell, S. Evans, R. Ewing, Capt. G. E. T. EYSTON, (*Chairman Southern Regional Board*), S. G. Fawcett, F. E. Fenier, *R. C. Fenton, R. J. Finch, G. D. Findley, D. W. Fisher, F. G. Fisher, W. L. FISHER, (*Past-President*), W. S. Fisher, DR. A. P. M. Fleming, C.B.E., C. N. Fletcher, A. W. Foerester, R. J. Forward, J. Foster-Smith,

Brigadier F. Fowle, M. C., A Francis, E. R. Francis, J. V. Franklin, A. Franks, R. S. Franks, T. W. Franks, G. Fraser, †T. Fraser, Capt. A. Frazer-Nash, Sqd.-Ldr. S. T. Freeman, A. S. FREERE, (*Public Relations Officer Min. of Labour and Nat. Service*), F. W. Fretton, P.A. Fryatt, D. F. Galloway, B.SC., WHIT. SCH., T. Gammon, P. Gardner, G. Gaunt, C. D. Gay, H. G. GEE, (*Private Secretary to the Minister of Labour*), *H. J. Gibbons, E.A. J. Gifford, A. Gilbert, S. Gilbert, J. Gilchrist, *J. R. Gimson, F. O. Gloss, F. A. Gluck, J. H. Goddard, A. E. Godding, R. C. Godfrey, A. Goldman, Commander Goodeve, Capt. E. Thompson Gratton, Major G. Greaves, B. Green, D. G. Green, N. Greenhalgh, H. Greenshields, E. B. Greenwood, L. A. Gregg, H. G. Gregory, H. Gregson, C. Griffin, G. Griffith, DR. W. T. Griffiths, H. GRINSTED, O.B.E., B.SC., (*Dep. Dir., Research and Develop., M.A.P.*), A. T. S. Groombridge, Engineer Rear-Admiral GURNELL, (*Admiralty, Area Officer*), T. Gurry, T. W. Guthrie, O. V. GUY, D.S.O., M.C., M.A., (*Min. of Labour and National Service*).W. Hackett, W. Hadley, †G. H. Hales, E. Hall, W. Hall, †F. W. Halliwell, Major M. G. Hallowes, G. W. Hamblin, T. Hammett, †E. W. Hancock, M.B.E., †J. A. Hannay, H. H. Harley, S. J. Harley, A. Harling, W. H. Harper, E. P. Harries, S. E. Harris, R. Harris, T. E. HARRIS, (*Dep. Dir., Gen., Ordance Factories*), F. A. Harrison, A. Hart, †H. A. Hartley, J. F. Hartley, F. Hartop, T. A. Hartop, W. D. Hayward, Dr. F. W. Haywood, R. Hazleton, H. W. Healy, F. T. Hearle, H. Heath, D. S. Heather, A. W. Hemmings, J. Hendra, J. C. Henora, Sir P. Hennesey, W. Hewett, G. W. Higgs, R. R. Higgs, Col. F. Highway, J. E. Hill, H. W. Hillman, W. Hilton, P.C. Hinds, W. C. Hindson, W. Hipwell, H. T. Hirons,H. W. Hobbs, W. V. Hodgson, C. Hodkinson, L. F. Hoeniss, G. W. Hogg, A. E. Hokins, S. J. W. Holt, G. R. Hook, Captain J. G. HOPCRAFT, M.C., O.B.E.., (*Dep. Dir., Material Production, M.A.P.*), C. J. W HOPKINS, (*Dep. Dir. Gen., Naval Land Equipment, Min. of Supply*). G. M. Hopper, F. F. Hopwood, T. L. Horabin, M.P., B. Horning, H. W. Horseman, J. W. Horton, E. R. Howlett, C. K. Hughes, C. H. Hunt, W. G. Hunt, R. Hunter, H. Hunting, W. J. Hutchins, H. V. Hutton, E. A. Hyde, T. J. Jackson, K. F. W. James, R. E. James, †B. C. Jenkins, E. W. Jermey, K. S. Jewson, F. Johncock, C. W. Johns, L. W. Johnson, M. Johnson, R. Johnson, A. Johnstone, ——Jones, E. H. Jones, E. J. M. Jones, W. L. Jones, C. R. Jordan, T. E. Jowett, G. T. Joyce, R. Joyce, S. Judd, Kaufman, W. Kean, T.B. Keep, O.B.E., J. H. Kellner, T. Kelly, L.A. Kelsey, W. H. Kent, *J. T. Kenworthy, T. R. Kidd, A Kiernan, A. L. King, F. King, V. King, E. Kipps, R. Kirchner, F. D. Kirkland, W. T. Kitching, R. F. Knowlson, G. Konried, J. E. Lane, J. B. Lang, A. H. Langford, O. W. Langford, E. Langley, G. A, Lansdowne, P. Latham, A. F. Law, O. Lawrence, *F. G. Laws, G. V. Lawton,

F. Lazenby, A. Ledger, L. Leech, Air Commodore Leedham, O.B.E., (*Dir. Radio Production, M.A.P.*), J. LEEK (*Managing Director, B.S.A. Co., Ltd.*,), H. M. Lees, G. Legg, Sir F. LEGGETT (*Chief Industrial Advisor to the Min. of Labour and Nat. Service*), C. LE MAISTRE, C.B.E., (*Director, British Standards Institution*), A. S. LE MAITRE, M.C., (*Principal Priority Officer. The Admiralty*), R. Levick, A. O. Levy, A. R. Lewis, H. W. Lewis, R. Lillico, E. G. Lloyd, J. G. Lloyd, G. Locock, K. C. Long, P.K. Long, F. K. Lord, D. M. Lowe, W. H. Luker, G. H. Lundgren, H. L. Lungmuss, D. MacArthur, G. Macdonald, H. J. Macnamara, F. W. McCartney, R. H. Mc Cartney, J. McDonnell, W. McGratton, A. McKinstry, A. McLeod, J. C. McPhee, J. O. Maddock, L. T. Maddocks, M. C. Marcel, A. Marks, 2nd Lieut. W. S. Marsden, G. R. Marsh, P. H. Marsh, R. W. Marshall, C. S. Martin, W. F. Martin, L. R. Mason, G. J. Mathys, W. W. Meacham, J. C. Meadows, R. T. Medd, J. I. Meeson, L. Meeson, J. M. Meston, J. Middleton, Lieut. G. C. Miles, C. H. Miller, E. Mills,—Mitchell, G. Mitchell, R. W. Moffatt, A. J. Mollart, K. Mollart, J. Montgomerie, J. E. MONTGOMREY, (*Secretary, Institution of Mechanical Engineers*), A. Moore, C. Moore, W. E. Moore, Dr. H. B. Morgan, M.P., G. J. Morgan, W. J. MORGAN, (*Machine Tool Trades' Association*), J. Morris, A. E. Morrison, W. J. Morse, W. Mosey, J. L. Munn, A. Murie, W. Murphy, G. H. Nash, C. E. New, A. E. Newby, A. J. Newman, H. Newman, J. Newman, R. F. Newman, N. B. Newton, L. P. Nickolay, D. B. Nivison, H. J. Nixon, W. E. Nixon, U. F. Norris, D. K. North, C. B. Northey, H. O. Norwood, W. Nugent, J. A Oates, F. A. Oakley, E. G. Odds, G. F. N. Oliver, J. E. Oram, A. H. Orcutt, H. F. L. Orcutt, R. Orcutt, A. N. Other, G. F. F. Ottley, W. Paddon, G. Padley, L. J. Page, Lieut.-Col. G. T. Paling,—Palmer, T. C. Parker, — Parsons, — Pattenden, J. Patteson, R. Pattinson, S. Payne, H. W. Pearson, J. R. Pearson, W. H. Pease, N. B. Peck, C. G. Pennycook, R. Pentony, A. J. Percy, S. W. Perkins, Admiral Perring, I. C. Perrott, F. Perry, E. Peskett, J. R. Pheazey, H. C. Pierson, J. I. PIGGOTT, C.B.E., M.C., (*Regional Representative, M.A.P.*), J. Piggott, S. E. Pinney, L. W. Pratt (*Press Association Ltd.*), P. Preston, T. W. Price, — Prince, E. Pryor, †W. Puckey, J. A. Pull, T. Punwani, P.R. Purves, W. A. Purves, A. P. Quarrell, T. G. Quinney, J. Randle, F. W. Rankin, W. M. Ratcliffe, A. E. Rawson, Major G. C. Reeves, R. W. Richards, G. A. Riddell, R. A. RIDDLES, (*Dep. Dir., Gen. Royal Engineers Equipment, Min. of Supply*), W. Ridgeway, E. J. Ring, L.L. Roberts, G. Robertson, N. C. Robertson, P. Robertson, P. G. Robertson, N. H. Robin, T. A. Robins, J. R. Robinson, C. Rockwell, H. Rockley, R. F. Rogers, F. H. ROLT, B.SC., M.B.E., (*Dir. Gauges, Min. of Supply*) I. Rose, H. Ross-Dreher, A. J. Rotheroe, J. J. Rowe, H. RUSSELL, (*Dir., Sub-Contracts, M.A.P.*), *R. D. G. Ryder, R. G. Ryder,

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(*Chairman, Works Management Association*), E. W. Young H. Young, *J. G. Young, D. R. Yule, R. Zieschang.

THE PRESIDENT, MR. G. E. BAILEY.

The Loyal Toast having been duly honoured, the PRESIDENT, MR. G. E. BAILEY proposed the Toast of "THE PRODUCTION FRONT."

He said: Before submitting on this occasion the Toast of "The Production Front," perhaps I may be allowed to refer briefly to the affairs of the Institution. First of all, I should like to congratulate the Institution on this magnificient gathering, which is surely a real compliment to production and to production engineers. I hope that the net result of this occasion, and of what we shall hear from Mr. Bevin and Sir Charles Craven from the Government's point of view, will be that, after taking into consideration the tremendous loss of most valuable production time (*Laughter*), we shall have a real boost in production.

I should like to thank the Council and the Special Committees and Section Committees for the way in which they have carried on the work of the Institution during the many difficulties of war conditions. In particular, I would commend the work of Mr. Kipping, the Chairman of Council, and of our very efficient Secretary, Mr. Hazleton, and his staff.—(*Applause*). The Institution includes a very large number of trained engineers, production experts, and I do hope that their services will be increasingly utilised by those who are responsible for the Government production programme.—(*Applause*).

By the passing of Lord Austin, our Institution has lost an outstanding personality. He was a Past-President, and for ten years prior to his death a Member of Council. We therefore welcome the action of Lord Nuffield in establishing a national memorial to Lord Austin, and we are proud to support that scheme.—(*Applause*).

I wish personally to thank those firms who have so generously contributed to our research fund, to enable the work of the Research Department to be carried on. You will recollect that the establishment of our Research Department was made possible by the munificent gift of £25,000 by my predecessor, Lord Nuffield.—(*Applause*).

The Production Front

About two years ago, on a similar occasion to this, I presided, and we had among our guests many representatives of our Allies and of the British Commonwealth. The toast on that occasion was "The Allies and Victory." To-day it was considered more appro-

priate that we should direct attention to the production effort of this country, and I therefore have the honour to submit the Toast of "The Production Front." Modern warfare, whether on land, on sea or in the air, has created an almost unlimited demand for many forms of mechanical products. It has been tragically demonstrated that men's courage and sacrifice are insufficient ; we must have a predominating supply of equipment. Only abundant supplies will enable us to take the initiative, and, when we have those abundant supplies, victory will be in sight ; but we must have sufficient to enable us to take that initiative and to make up for the heavy wastage of modern warfare.

We, as practical men engaged in one way or another in production know that, whilst appreciating to the fullest extent the great sacrifices of our Allies, the increasing contribution of the Dominions and Colonies, the magnificent effort that Russia has made and is still making (*Applause*), as well as the financial and material assistance of America, it is upon the production effort of this country that the final victory will rest.—(*Applause*).

Our production front, comprising Government, Management and Labour, is the key to the whole position ; if that fails, all fails. But it will not fail. We in this room and those whom we represent will see to it that it does not fail. We are here to-day in the cause of victory, and it is our job to ensure that supply of munitions of war which will enable us to make certain of victory.

Criticism

So much has been said and written in the past about production that I have hesitated to say anything to-day, certainly anything which could be construed as criticism ; but I am remined that, as President, I am expected to say something on a subject which I suggest is the most important one before us to-day, and one which concerns our members very closely. There has been a good deal of criticism, much of it destructive and personal, and this I would term negative effort. By all means let there be constructive criticism by those who understand the subject. I suppose there never was a subject about which "so many, knowing so little, have said so much."—(*Laughter and applause*). In so vast an organisation, built up to meet the sudden national emergency, there were bound to be shortcomings in all three elements of the production front ; what matters most, however, is that these shortcomings should be speedily removed and remedied.

War production is an uneconomic business at best. It is necessary to carry it on under conditions which do not make for industrial efficiency. Government, Management and Labour must work out together the conditions most conducive to efficiency. It is not an easy task ; it requires goodwill, forbearance and sacri-

fice on all sides ; and therefore, to those engaged on the production front, I say " Away with carping criticism. Be as energetic and as constructive as is humanly possible."

Government, Management and Labour

Let the Government direct : let us have from the Government clear and precise instructions as regards their requirements, quick decisions and the minimum of red tape.

Let Management manage (*applause*), and let Government ensure the necessary materials, equipment and labour, and let management understand the problems of labour. Let Labour discharge their important part under fair conditions of employment and wages, as agreed between the employers and unions and in line with the declared policy of the Government. Let labour understand the problems and responsibilities of management, and let both management and labour together understand their obligations to the people and to the State. Thus we shall obtain that efficient co-ordination and willing co-operation which is so essential to maximum production.

Welcome to Guests

Time did not permit the inclusion of the usual Toast of " Our Guests." However, I do on behalf of the Institution most heartily welcome here to-day all our guests, and in particular our chief guest, Mr. Ernest Bevin, Minister of Labour and National Service and Chairman of the Production Executive of the Cabinet.—(*Applause*). The most important factor in production is the human element. The Government, through Mr. Bevin, holds a monopoly here, and the exercise of this power is an enormous reponsibility. Mr. Bevin has to provide the whole of the male and female personnel required not only for the production front but for the Armed Forces as well. It is not an easy task to discriminate between industry and the Services, particularly where skilled men are concerned. I do, however, with knowledge of both sides of the subject, appeal to employers to make further efforts to provide the skilled men so urgently required to maintain and operate the highly technical products which are being increasingly provided for the Forces, and on the satisfactory operation of which valuable lives and ultimate victory will depend. The Prime Minister has said that Mr. Bevin has a job which few would envy, and I think that most of us will agree with that. It is our sincere wish that Mr. Bevin may be granted good health and wise guidance in the fulfilment of his great responsibilities.—(*Applause*).

We are very glad to have with us to-day Sir Charles Craven, whom we all welcome back to the Ministry of Aircraft Production. —(*Applause*). We are also happy to be supported by all three units of the production front : labour is represented, management is represented—and in management I include the Presidents of kindred engineering institutions—and, last but by no means least, it is a matter of great satisfaction to the Insitution that the Government are so well represented by the people with whom we have to deal from day to day ; I refer to the senior officials of the Admiralty, the Ministry of Supply, the Ministry of Aircraft Production and the Ministry of Labour and National Service. I ask you to rise and to drink to the Toast of " The Production Front," coupled with the name of Mr. Ernest Bevin.—(*Applause*).

MR. ERNEST BEVIN

The RIGHT HON. ERNEST BEVIN, P.C., M.P., Minister of Labour and National Service and Chairman of the Production Executive, who was received with applause on rising to respond, said : When you heard that wonderful introduction—" Minister of Labour and National Service and Chairman of the Production Executive "—you must have said to yourselves " What a very diverse and difficult job," but nothing can give me greater pleasure than to respond to this Toast to-day, especially as this important gathering is representative of production engineers and others associated with them in our great factories throughout the country.

In looking through your Constitution and Articles of Association, I gather that the Institution's principal object is to promote the science and practice of production engineering. I was encouraged by the fact that you have now nearly 3,000 members. There must be about a third of them off duty to-day ! (*Laughter*). I hope that you will make up at the week-end for the time spent at this gathering ! (*Laughter*). Your membership represents a fairly formidable army of the leading production engineering experts in the country, most of whom, I am sure, are devoting their full strength to the supreme task of producing the necessary implements to enable our magnificent forces to win this great struggle.

We have been very happy to have your War Emergency Committee in association with the officials of the Production and other Departments of the State, and we are grateful to your organisation for the services that have been rendered up to date.

The Personnel Problem

The Government and industry have their mutual parts to play. At the moment, as your President has well said, the danger is

that we get too much destructive criticism and not enough constructive effort.

It is your function to plan and direct productive operations, and it is my duty—and I accept it whole-heartedly and without reserve—to do all that I can to supply you with the necessary labour in order to produce the speediest and best results. Parliament and the Cabinet have placed upon me the task of planning the distribution of man-power throughout the country and of devising the best means of harnessing it to the war effort. I was tremendously handicapped by the fact that for twenty years we had between two and three million unemployed, and you who were engaged in production could send to the labour exchange and get what you wanted. I do not minimise the great results of your rationalisation and technical development, but I think that you, as production engineers, will agree with me that you were not forced by the circumstances of the economic situation before the war to pay sufficient attention to the personnel problem as a part of production, owing to this great reserve of unemployed. (*Applause*).

The Training of Labour

Foremost among the means of harnessing man-power to the war effort are the encouragement and promotion of training in the workshops and in the large training centres which are maintained and directed by the Ministry. I am inclined to ask how many production engineers and how many of those concerned with management have taken the trouble to visit our training centres. I say without boast we have not made a bad job of it. (*Applause*). It has been a struggle to get those concerned with management to visit our training centres and see the task which I have undertaken. I invite you to go to these centres in the various districts and see what is being done. I accepted the view that there was not a single productive person in this country who could not be turned to account, even if he was a cripple; and I ask you to take advantage of the facilities offered.

I welcome the Memorandum produced by your Institution on the Recruitment and Training of Labour for War Work; I regard it as extremely helpful and useful, and we have made good use of it. I am very grateful to you for it, and, before I finish my speech, I am going to ask you to do something more. I should like to quote and emphasise in passing one point from that memorandum: that the success of the upgrading courses undertaken by the Ministry depends entirely upon the degree to which employers of labour are prepared to co-operate with the training section of the Ministry of Labour. This has an important bearing on our use of skilled labour, to which I propose to refer later.

Optimum Labour Effort

I was very interested to note that you have adopted as one of your principles that, as a scientific organisation, hours and conditions of labour are no concern of yours, but that the training and the use to be made of labour are matters to which you can properly devote your attention. In so far as the payment of wages is concerned, that is no doubt a wise decision, but I should like to have seen more attention paid by the production engineering organisations to the working out and application of an optimum labour effort, and I invite you to direct your attention to it. In my view, sufficient attention has not been paid to this subject, nor has there been due consideration of the fact that workers have had to carry on through two black-out winters, with long hours on intense production. What has been proved, however, is that serious difficulties have been caused in the world of production during this past year by irregular hours, some of them necessarily due to the circumstances of the moment, but others enforced and operated without regard to the most precious and valuable of all machines—the human. I have done my best to get industry to pay more attention to this matter, for I was convinced that the long hours that were expected of the workers were having a bad effect on our total production. (*Applause*).

It seems to me that in war this question of optimum hours is not so much one of bargaining between trade unions and employers as one demanding a scientific approach which takes account of all the factors involved at any given time and recognises the need for adjustment as those factors change. Those responsible for the direction of production should quickly, energetically and scientifically deal with the problem and make such adaptations as are necessary in order to preserve the physical strength of the human being and his morale and to create the feeling that the well-being of the industrial army is being properly taken care of. I am certain that if more attention is paid to this matter than has been given to it hitherto, it will prove of invaluable assistance.

I have been reluctant to make orders on this question of hours, because they tend to become inflexible and cannot be changed quickly enough in wartime to meet necessary changes—changes which may not apply universally, as legal orders, of course, must. For instance, you may have a town blitz or a district blitz, with consequent shortage of food supplies and some interruption. In such a case I would ask the production engineer, as a part of the production effort, at once to consider whether an adaptation of hours of effort ought not to be made in the light of the circumstances that the enemy imposes upon us, and to see that while on the one hand production is not unduly reduced, on the other hand the people

feel that, just as you look after the machines, so you are looking after the well-being of the great human factor as well. (*Applause*).

Collaboration on Personnel Problems

I desire in responding to this Toast to raise certain points and to turn to account the opportunity you have given me to address you. I did not think that you wanted a lot of platitudes to-day, and so I thought I would try to devote myself to certain factors which appear to me as Minister of Labour to demand our attention. I particularly want to place before you my conviction that in designing, planning and working out the proper utilisation of our productive units there is an imperative necessity for closer collaboration between the personnel manager and the rest of the executive, including the production engineer. (*Cheers*). The functions are equally important; the best of plans which you can devise can be totally upset, and much effort vitiated, if the important human factor is not adequately considered and measured as a part of the general plan of production. There should, in fact, be constant collaboration, owing to the changes which war produces. Especially was this collaboration necessary when the dietary of the people had to be lowered. It was lowered for very good reasons. With the Battle of the Atlantic to fight and the building up of our armies abroad, the effect on shipping and on the volume of imports compelled us to introduce restrictions in the food supply of our people.

The Cabinet had to take a very difficult decision. The Middle East was left as an open gap for our armies. We had to call upon the refrigerator tonnage and make use of the fastest ships to build up a great army to take the place of the French defections. What was the result? Immediately we did it we had to lower the dietary of the people to a shillingsworth of meat a week, and we had to lower the canteens to a penny a day. The effect of that must be apparent. When these great dietary and domestic changes take place, I should like to see—and I appeal for it now, because the situation may arise again—managements recognise it as an obvious duty to say "The physical standard may be lowered, and adaptations must be made, and made immediately, if we are to maintain the morale of our people." I suggest, too, that when blitzes take place or there is undue disturbance of some other kind, the question of hours of work and o the effect on human effort in a period of that character needs constant and unremitting study.

Confidence in the Government

I would therefore ask you, in this connection, to appreciate the Government's difficulty. We cannot always tell the world why we have had to come to our decisions. You must take it that we are

not acting like a pack of fools. There are some things that we cannot tell the enemy. The Naval Staff, the General Staff of the Army and the Air Force put their difficulties before us, and we have to come to conclusions. Either trust us or turn us out : do one or the other. (*Prolonged applause*). We have to deal with difficulties and to take decisions affecting millions, and we are entitled to ask industry to be receptive and to say " The Government would not come to this decision without good reasons, and we must loyally make adaptations to meet the circumstances." (*Applause*). You cannot have a comfortable war ! (*Laughter*). Many people in England expect us to be able to give that to them. but we cannot do it. War is a very disturbing element !

The Importance of Personnel Factors

In the layout for our war effort, sufficient attention was not paid to the personnel problem. It took us a long time to get industry as a whole to appreciate the need for proper canteens and to imagine what blitzes would be like. Whole districts in this country, when I issued an order for canteens, took no proper steps. You must have more imagination than that. I know of districts which had to make use of mobile canteens, which were intended to feed women and children, in order to feed workpeople, because they had not responded to my demand that canteens should be provided for workpeople in case a blitz occurred. I did not take these decisions merely for the sake of taking them, but because I had sufficient imagination to know what the circumstances might be like. I ask you when these decisions are arrived at to respond with alacrity. When I came into this coalition, I came into it to help to win this war. (*Cheers*). Whatever my personal predilections, I put them aside. But I knew what was necessary to handle the labour problem to win this war, and therefore I am entitled to say to other people " Put your political predilections aside and respond, when the Government come to decisions of this character."

I emphasise this now because, although we have had a respite, we shall have to face it again, and the longer the war goes on, the more necessary it becomes to pay greater regard to this personnel side of industry. The absence of a proper understanding of the problem has been one of our greatest handicaps in this great struggle. Remember, thousands of people have had to be moved, have had their homes broken up, and have sometimes been billeted under conditions which were not good. All these factors have a bearing on the inevitable human problems which are bound to arise ; hence my additional plea for the personnel manager, who should be specially trained, to have an equal position in industry with other members of the executive. Indeed, I am sure—and

I would emphasise this—that our post-war position will be materially helped, and the future prospects of British industry enhanced, by a full appreciation of this important fact.

Sustained Effort and Spasmodic Effort

The next thing to which I should like to refer is the question of sustained effort. It is well to remember, in this mechanised war, that our factories and productive capacity are pitted not merely against those of Germany but also against those of the countries which the Nazis have overrun. We have a smaller population than Germany ; we have 44 millions, and less than 20 millions who can be used in the maximum call for productive effort. Germany now has a working population under her control, apart from Russia, of nearly 180 millions. It is a terrible handicap that we have to make good, a tremendous handicap.

Our raw materials have to be brought from overseas and, in addition, the enemy had many years' start, and not merely years of production ; it is clear now that, long before Hitler came in, regard was being paid in Germany to the possibilities of another war and to the possibility of factories being switched over to war production quickly. On the other hand, we were going merrily along with our commercial business until the war broke out, and not taking seriously into account the demands which would inevitably fall upon us. During the whole time of the Dawes plan, every German factory was being designed so that at any given moment they could be switched over to war production. It began in 1924, not in 1933, and it went on, and production itself started in 1933. As production engineers, you know that it is not so much a question of the date when you start production as of the planning of your factories to switch over quickly ; that is the main problem. (*Applause*).

There was here a very great delay in the swing-over from peacetime to wartime production. In saying that, I am not blaming any one party. I have said on a hundred platforms and I have said as a trade union leader that we all refused to face the facts. We have all to take the blame. We argued about one thing and another, but we refused to face the inevitable consequences which were coming upon us. No-one knows better than those very much criticised officials in the Ministry of Supply to-day how difficult it was to get firms to appreciate the necessity of undertaking responsibility for wartime production prior to the war breaking out. It is no use crying over spilt milk, but, if this deficiency on our side is to be made good and parity reached, spasmodic effort is not enough. (*Applause*). It may serve as a momentary stimulus, but its effect is not usually lasting. The factors that will count are proper timing, flow of materials and components, and the

sustaining of effort over a long period with a continuously increasing rhythm. Nothing, I suggest, is so irritating to the workpeople as to be screwed up to a great pitch for a short period and then to have a period of reaction and slack work and idling. A study of the curve of production over a period of months reveals that the final result achieved by spasmodic effort is not so good as that resulting from well organised and sustained effort, with a carefully-timed flow of materials and components, for ever-increasing production. (*Applause*). The workers like to be kept going, and the whole direction of our productive effort, in what may well be a protracted struggle, must more and more be organised on such a basis that it can be sustained and progressive right to the very end.

New Factories and Labour Supply

In this connection, let me say that I have witnessed a tendency, when orders are flowing and expansion is needed, to send up a constant cry to extend factories. We have not got the building labour to keep all this going. We cannot get it and cannot make it ; and therefore I ask you, as production engineers, to utilise the results of the concentration of industry, to utilise the labour where it is and the buildings where they are, instead of praying to us all the time for labour and for new buildings everywhere. I ask for that especially because I have to provide labour for airfields, for the forces and so on. Nothing can be left to chance, and I do think that the easy way of coming along and asking for new buildings, without regard to the effect on man-power or to the effect on the people, is to be deplored. We have not the housing in this country to billet them, and why should not we use married women in their own districts, women who are immobile, in order to get the benefit of their labour ? It is better for you to use their work where they are than to have to move everybody to overcrowded districts. (*Applause*).

The Rationing of Skilled Labour

It is sometimes not appreciated that we started this war with a dearth of really skilled people, and we have been compelled to ration them out, so that we can maintain production and at the same time open up new factories and train more workers. We created labour supply committees, training establishments, labour inspectors and everything that human ingenuity could devise to try to make good our deficiency. We are handicapped by the fact that we are a very conservative people —and experts are conservative, too ! (*Laughter*). I must confess that at times I have felt a sense of great frustration. There is pressure from the Services for their equipment—radio location, small arms, battleships, cruisers, submarines and the rest—and pressure from the

production departments for output, all of which involves quick decision and quick action. But I think that I shall not be taken amiss if I say that we too often meet an attitude of mind that indicates a failure to appreciate the urgency of matters, and too often we receive the reply that it "cannot be done." Those words have to come out of our vocabulary for the rest of the war. (*Applause*). Especially is this true when there is a call for a redistribution of skilled personnel. I want engineers not to say "We cannot spare them" but to confer with my inspectors and say "Can we spare them?" and to appreciate what we have to accomplish. I am not acting in any ruthless manner, and I do not act out of any kind of opposition to anybody; but I have to get the labour, and I have not an incubator at the Ministry of Labour which will turn out skilled men by hatching them, (*Laughter*). I have to distribute them, grade them, and finally get the result that the State demands. I emphasise this because as the programme expands and it must expand more and more—I must ask everyone responsible for production to turn his attention to getting the greatest possible use out of our total available skill. Now, this is where you can help me, and where you can help the country to victory. The differences in achievement in this direction are very striking. The ratio of skilled people to trainees and others in one works may be much larger than in another works, doing the same operation. There are differences of from 10 to 30 per cent. Now, production engineers, we will give you all the titles you want if you will get that down! (*Laughter*). I think there should be a special honour for doing that, and, if they will not give you a title, we will do for you what Bonar Law once did for a man who asked for a title—we will authorise you to tell the Press that you have refused it. (*Laughter and applause*).

I do want your help in doing this. What ought to be the ratio of skilled to semi-skilled in these various operations? I want some guide for our inspectors, and you are the men who can help me with that. You helped me with the Training Manual, and I call on you to-day to work that problem out scientifically. I am not an engineer—that is why I know all about it! (*Laughter*). I really want to have something settled, but not something static—it should still be capable of improvement. There is no greater service that you as production engineers can render to the country at the moment than to provide some kind of guide for my labour inspectors, so that they can say to a firm "The experts in this industry have found that in a series of operations in your industry, this is what you should require." It will save many conflicts between my inspectors and your managements; it will be a useful guide, and will help to bring backward people up to the mark.

I do not complain of this difficulty at all. I want it to be clearly

understood that this country has had to live on its export trade, and so it has had to cater for every idiosyncrasy of every customer in the world and our supreme craftmanship has been a tremendous asset in British industry hitherto. (*Cheers*). I do appreciate that, but I have to convert that peacetime attitude of mind into a war production effort in which the minimum use of skilled labour is vital.

Skilled Men for the Forces

There has, however, been much to encourage us. An examination of the problem in the Forces has been undertaken, and in this we have had the assistance of your President. In the case of the Air Force, a really wonderful accomplishment has been revealed. They have built up their great servicing branch on a very low proportion of skilled journeymen, and I do not hesitate to say that if industry had done as well as the Air Force, the problem of skilled personnel at this moment would have been pretty well solved. That is a challenge to you. Indeed, we must get more journeymen for the Air Force, and industry must produce them. The men who are fighting in the air to defend our homes are entitled to the best skilled assistance to keep these great machines in a high state of efficiency. The number of really efficient journeymen for testing and supervision is too limited, so do not sit down in your offices and say "We cannot spare them," and then listen to the wireless and say "What marvellous fellows they are!" You have a duty to do, and I have a responsibility to deliver the skilled men to the Air Force. I do not want it on my conscience that as Minister of Labour I hesitated to transfer the number of skilled men necessary, in order to keep these magnificent machines and fighting men well served in the task which they are undertaking on behalf of humanity at the present moment. (*Applause*). At a later stage, when the inquiry is completed, we shall probably find a similar set of circumstances in the Army and Navy.

Training and the School Leaving Age

I am sure that to a gathering of this kind there is no need for me to emphasise the imperative necessity for more training. Sir Charles Craven is going to refer in a few moments to the work of women, but I should like to make one great appeal, which he will probably emphasise. Women—enthsiastic women, women who want to win this war, many with husbands or other relatives fighting for us —are complaining to me very much that in some factories not sufficient attention is given to turning the skill which they have developed in the training centres to full use. They want, and they are entitled, to progress, and their enthusiasm must

not be damped as a result of any failure to utilise their ability to the fullest possible extent.

At this point I should like to say how much it has been borne in upon me, since I have had to deal with the problem of man-power, that the State made a great mistake in maintaining such a low school-leaving age for the last twenty years. How valuable it would have been to the State now if those children had been kept at school and under the control of the educational institutions of the country for another couple of years, and a portion of that period devoted to some form of training, so as to give them at least a basic knowledge of production, not merely in industry but in agriculture. (*Applause*). I am quite certain that if a scheme of that kind had been in operation since the last war it would have facilitated now the building up of our defence forces, reduced the training period and increased our productive capacity to an enormous extent. Indeed, it would have been of inestimable value ; and, while it is a sound proposition from the point of view of good citizenship, it would also have been a very big factor in matters of production and defence. I trust that this will be borne in mind in the future.

Another thing which must have concerned you, as it has us, is the question of rehabilitation. We had, as you know, a very large number of unemployed, many of whom came to be regarded as unemployable. Well, we have shown to the world in this war that there is virtually no such thing as an unemployable person, unless he is really mentally and physically incapable—and that does not apply to workpeople, as a rule. (*Laughter*). If proper training is given to them, and opportunity for employment afterwards, these people can be employed. Hence the importance of the medical and nursing services as part of the production organisation, and this should be linked up with treatment outside and with a great national rehabilitation service. This will see to it that no producing unit is allowed to be wasted, and no person who is injured as a result of enemy action or who is the victim of an accident in our great industrial arena is left with a hopeless outlook for the rest of his life. (*Applause*). It may lead to the necessity of adapting machines to the man instead of the man to the machines, but that is not difficult, and I would ask your Institution to make a special study of this problem. If we get a heavy casualty list from the Services as a result of this war, as well as from our industrial accident roll, you will agree, I am sure, that a national rehabilitation service is vital to the nation. I regret to say that on this point—and it is with very great regret that I say it—we are about the most backward nation in the world in dealing on a large scale and scientifically with this vexed problem. We cannot at this stage afford to neglect man-power.

The Personnel Needs of the Forces

I should now like to say a few further words about personnel for the Forces. One gets a little tired of the constant demand for the return of people from the Army, and of resistance to the call to make up units to a proper fighting strength. If we listened to all the demands made upon us, we should never have an Army, and certainly it would never be properly trained. I assert—I ask you to take this from me ; I cannot give you figures, but you must believe somebody, and I ask you to accept it with sincerity —that, having regard to the task which we expect will have to be performed before this war is over, the numbers allocated to the Services are not too large. Indeed, I am more than satisfied, looking at the question as one outside the Services, that for the task which the nation will call upon them to perform we have not made an over-estimate in this respect. It must be remembered that when fighting really develops in other fields the wastage will constantly have to be made good by fresh drafts. I would emphasise again that it is not only fighting men who have to be provided, but servicing and transport, and, with the speed of a modern army, this is intensified.

Ought we not, as citizens here at home, to regard it as our fundamental duty to use our ingenuity and ability and the great labour resources which we have to the utmost ? We hear constantly of wasted efforts in industry. To what extent there is truth in it, it is impossible accurately to say, but I can say this, that the demand made in the productive field for man-power is just colossal. It must be remembered that when working in buildings and factories your man-power is static ; you do not get a drain away continuously to provide drafts to make up wastage, as you have in the Services. In other words, you do not give six months' training and then draft your people out to the Middle East, or some other theatre of war, and then have to train another lot. Industry has a better chance of progressive improvement in skill and of further simplification in operations in order to make up any deficiency. I would urge, therefore, that everyone responsible for production in this country should endeavour in the first place to foster the co-operative spirit in the works, and secondly to make the fullest possible use of all available labour, and to consider, having regard to the claims made upon us, how far it is possible by change of methods, adaptation or adjustment to reduce the demand and so facilitate the building up of a properly balanced human labour force for a total war.

You may take it that the Government are constantly working to this end. One might imagine from the Press and from some of our other critics that we did things just haphazard. I can assure

you that this is not so. Everything is being carefully organised, with this figure of 44 million people in our minds, to see how much we can get out of it.

Use of Machine Tools

We are very concerned about the total use of machine tools. Try to get your people to help us, and I will help you by doing what I can to get night shifts on and the working of machine tools for the full 24 hours. I know the difficulties and the problems that confront you, but I believe that if all divisions between management and labour could be broken down, the whole factor of production regarded as one service, and a right leadership developed—a leadership which would produce confidence in the mind of the humblest worker—even better results than we have yet achieved would be attained. Do not fail to take that into account when you come to decisions and changes in practice. Resolute determination at the top to win the war will reflect itself right down through the whole organisation.

The Greatness of Britain's War Effort: Russian Needs

I have taken this opportunity of addressing you in this manner, and not in the usual form of responding to a Toast, by confining myself to saying how good everybody and everything is. At the same time, there is a great deal for which to be thankful. I have put before you some of the difficulties with which the Government are faced, but in spite of them all the last sixteen months of effort in this country has been amazing. It is impossible to reveal all that has been accomplished, but a nation less determined would have been defeated in the Battle of Britain, in the Battle of the Atlantic or in the Middle East. The ingenuity, resourcefulness and energy of our people deserve the highest praise. I believe that they have won the admiration and respect of the world, and have made the greatest possible contribution to winning to our side every day more and more friends of freedom throughout the world. They recognise that a nation that is prepared to spend itself, to work as our people have worked, both management and men, and to organise as we have organised, with all the terrific handicaps against us, must be a nation that whole-heartedly believes in the cause for which it is fighting. I am not, therefore, in critical vein, but am simply obsessed with the task that we have on hand.

You will appreciate the added obligation that is now imposed upon us : Russia has made a brilliant and resolute resistance (*Prolonged Applause*), but much of her productive capacity has been knocked out, and her transport has been impeded. It is very difficult for us to afford the transference of our own production,

having regard to the commitments into which we have deliberately entered and the policy to which we aim to give effect, but we must take risks and we must make sacrifices. I am convinced, and indeed I call it out now, that there is a great untapped reserve of managerial and productive energy and drive in this country that must now be called upon if we are to keep Russia in the field, and our own defences developed at the same time. (*Applause*). It is like bringing up your reserves ; and this drive must be directed to a great objective. We must sustain at least a six to twelve months' drive so as to enable us during that period to hand to Russia, out of our own production and the addition we can create, a great flow of equipment to aid her in her defence and our great mutual victory.

This is not a time for rhetoric or mutual admiration ; it is rather a time for heart-searching and grim determination to achieve the utmost. Therefore, while I thank you for the terms in which this Toast was proposed, and for the way in which you have received it, I shall go away with a feeling of confidence that, through the efforts of your Institution and others like you, the wheels of industry will spin faster than ever, and that not a day will pass without an exmination of all our consciences to see whether we have done all that we might do to bring this world catastrophe to an end and once more be enabled to return to the ways of peace and liberty. (*Prolonged applause*).

SIR CHARLES CRAVEN

Commander Sir Charles Craven, O.B.E., R.N., Controller General, Ministry of Aircraft Production, then proposed the Toast of "The Institution."

He said : I should first like to put on record my surprise at Mr. Bevin suggesting to you that you should revert to Sunday labour after this party, because for the last three months he has been impressing upon me the necessity of one day's rest a week. (*laughter*), I should also like to make a protest to the right honourable gentleman, because when we were having a cocktail before lunch I told him that I proposed to say something about women, and, as you will have noticed, he has pinched the women.—(*Laughter*).

I am afraid that to-day you see me cloaked with resectability, which is unusual for me when attending a party of this kind. Previously when I have met those engaged in industry I have spoken to you as one of you, and therefore have used the language to which you are accustomed in your daily life.—(*Laughter*). To-day, unfortunately, you see me as a very chastened Government servant ; and, as you know, all those who serve the Government have to be

extrememely careful about what they say in public (*laughter*), especially in the presence of His Majesty's Ministers !

I should like in the first place to tell you how delighted I am to see among you so many old friends, and to be able to congratulate them on looking so fit. I had heard about the terribly long hours which you are all working, and I expected to find a lot of haggard old gentlemen as members of your Institution ; but instead I see many whom I have known for years, looking fitter and younger than the last time I saw them. Whether this is due to the high price of whiskey (*laughter*), or to the fact that it is impossible to obtain beer at any price, I do not know ; but at any rate I am glad to see the splendid result of the change in your diet.

I was warned by your secretary to be extremely careful to keep my short speech on a level of respectability, as your President wanted to show that people like myself, who were born in the town in which he occasionally works (*laughter*), were of the highest moral character. This is another excuse for my departure from my usual standard ! However, there is another reason why to-day I cannot be quite natural. I intended to rely on the efficient service of the Permanent Secretary of the Ministry in which I serve, Sir Archibald Rowlands, to give me a few stories for my speech, but unfortunately at a few hours' notice he departed with Lord Beaverbrook to Moscow.—(*Laughter*).

The Institution and the Vigour of Youth

Joking apart, I am personally very proud that I should have been singled out to propose the Toast of your Institution. You are now twenty years old ; you have passed through the difficult years of puberty and pimples and have almost attained maturity. I do beg you to keep the youth of your Institution as long as you possibly can ; please do not grow up to rely on the glorious traditions of the past in engineering and production, but rather face the future with all the vigour of your youth.

It is really almost an impertinence for me to speak to you, you who are all experts in production. As most of you know, I am not an engineer, and I do not claim any great knowledge of production ; but I have at any rate served a 29 years' apprenticeship as a semi-skilled man, watching people like you do your daily work ; and sometimes, as you know, the onlooker sees most of the game.

Mr. Bevin has from time to time impressed on industry the necessity of disregarding birth, education and so on, and promoting people to positions of responsibility in our industries entirely on merit. Whether I have been right or wrong in all the appointments which I have made in the company in which I serve in normal times is for others to judge ; but I can honestly say that

in my own group of companies—which, when all is said and done, is the greatest engineering group in the country—I have never allowed social qualifications to interfere with the advancement of my people to positions of great responsibility.—(*Applause*). Even technical qualifications are not the only things that matter in making appointments or promotions. I know many people with very great technical knowledge who tell me that they do not want to add to their personal responsibilities. I believe that in choosing men for promotion, as many of you must have to do from time to time, the first and foremost thing to consider is the character of the man under consideration.

Many leaders of industry, I am told, have recently referred to the difficulty of filling vacancies in management as they arise. Well, if any of you here, and especially those in the larger firms, are finding that difficulty serious, I do suggest to you that you have only yourselves to blame ; because those of us who are advancing in years have certainly failed in our office of management unless we have brought along young people of merit who are ready to succeed us.

Number and Quality of Aircraft

As you know, my whole time now is spent in an endeavour to deal with the ever-increasing demands on the aircraft industry from our only two clients, the R. A. F. and the Fleet Air Arm. As you will have seen, during the last week in August we had our record week's output, and in the month of August, in spite of holidays, our record month's output. But I beg of you not to think only in terms of numbers of aircraft. You have to consider the greatly increased horse-power, the greatly increased structure weight, the greatly increased number of man-hours needed in order to provide the improved aircraft, when assessing the great industrial effort on which those in the aircraft industry are engaged. We are, as I say, being pressed constantly to increase not only in quality but in numbers ; and, in spite of the obvious appearance of contentment that the Minister of Labour has acquired since he became your guest before lunch, I can assure him that he is in for a few sleepless nights when, in a few days' time, we let him know our latest demands !—(*Laughter*).

Women in the Aircraft Industry

The Minister referred to the employment of women. I recently took stock of the numbers of women employed in the aircraft industry, and I found that the percentage to total employees was under 30. I know that many of you will say that I am only an amateur in these matters, but, after consulting experts in the industry and experts in my Ministry, and weighing up the varied advice which I have received, it is my definite opinion that the

figures of under 30 per cent of women and over 70 per cent of men ought to be reversed.

The Minister has mentioned to you the necessity of watching the women who enter your employment in works and promoting the right ones. Perhaps I may be allowed to confirm what he has said, because recently I have seen in many works the very great care with which the management are facing this problem, which, of course, at any rate for the younger members of the management, is a completely new one.

It is people such as yourselves, the members of this young but great Institution, who can render a great service by still further efforts in the training and grading and promotion of women. I have seen the wonderful work done in many shops, and, given reasonable training, it really is marvellous what these women can do. I should also like to confirm what the Minister has said about considerations of home life and so on which you have to have in mind when dealing with this difficult problem. I believe that, handled properly, the women of this country are going to save us in our great industrial effort, at any rate in those lighter industries in which I am particularly interested at present.

Tribute to Lord Beaverbrook

As you know, I have the privilege of being, as it were, the head foreman labourer in my Ministry. I had previously served in the Ministry of Aircraft Production when it was first formed by that great little man, Lord Beaverbrook. He was not an easy master, but, however roughly he treated us at times, I do not think that there is anyone in the Ministry who served under him who was not filled with an enthusiasm on leaving his office which he did not possess when he entered it. And now, as you know, not content with having flown twice across the Atlantic recently, he has gone off to Russia to help our Allies and I am sure that those of you who know him as I do will wish him very great success, and will hope that he will be of the greatest possible help to those Allies. —(*Applause*).

Although Lord Beaverbrook has left us and gone to "another place," the Ministry, under Colonel Moore-Brabazon, is to-day as happy and, I believe, as efficient a machine as a Government department can be. We who serve in Government departments know only too well what those of us who serve in industry normally feel about us, but I do believe that this young Ministry is run, as far as a Government department can be run, without red tape or unnecessary interference with the many thousands of firms who are working for us, Those of you who are in the aircraft industry suffer terribly, I know, from constant modifications and changes in design and type with which we have to ask you to deal, but when-

ever you are cursing and swearing at us for these changes, do please carry your minds back to last summer, and do appreciate that it was not the quantity of our fighters that beat the Germans in the Battle of Britain, but the fact that we had two types of fighter that were a damned sight better than anything that the Germans could put up against us.—(*Applause*).

Improvements in Aircraft Design

We have constantly, from day to day, information coming in about improvements in the enemy's machines, and especially in their fighters, and we have to improve in order to keep ahead the whole time. The information which I get from the Royal Air Force, is that we are keeping ahead ; and I can ssure you that at any rate those who work with me are thoroughly satisfied that, although it may temporarily interfere with that rhythm and flow of production to which the Minister has referred, we must at times, and I fear somewhat frequently, make these modifications and improvements, in order to give our serving people the very best that the country can produce.

Your Council have paid me the very great compliment of making me an Honorary Member of your Institution—presumably because they know that in my present office I could not afiord the proper subscription.—(*Laughter*). I am very proud indeed that I am an Honorary Member, and I believe that Lord Nuffield and I are the only two Honorary Members that you can afford to support.—(*Laughter*). I do not suppose for one mement, looking at Lord Nuffield as he came in to-day, that he will need any financial help from you in his old age, and I can assure you that I shall be only too willing to accept whatever pension you may award me from the surplus funds which I am glad to see you are building up—and, if you like to cash in at a discount, I am quite ready to do business to-day ! (*laughter*).

You have run two risks to-day. One is in giving your guests half an hour at a reception in which to refresh themselves at your expense before lunch.—(*Laughter*). The other is in accepting me as an Honorary Member. It reminds me of an old piece of English poetry which I have quoted on other occasions, and which shows the danger of admitting people hastily into your friendsip—

One day in sweet September—or it may have been November—
I was walking down the Strand in drunken pride,
When my legs began to flutter and I fell down in the gutter
And a pig come by and sat down by my side.
As I laid down in that gutter, without a word to utter,
A lady passing by was heard to say
" You can tell the man who boozes by the company he chooses"—
And the blooming pig got up and walked away.

—(*Laughter*).

I thank you again for your kindly hospitality and for all that you are doing for the production of the weapons of war which we require and shall require in ever-increasing quantities. Believe me, I do not think that Mr. Bevin was referring to our industry in some of the remarks which he made about the handling of men. I believe that the engineering industry does not look upon itself as a purely mechanical production machine. I have been associated with many organisations connected with the human side of the industry, and I believe that you are all in a very great human undertaking.

I give you the Toast of "The Institution of Production Engineers." You are doing a great work, and I hope that you will do more. I couple the Toast with the name of the Chairman of your Council, Mr. Kipping.—(*Applause*).

MR. N. V. KIPPING

MR. NORMAN V. KIPPING, J. P., Chairman of Council and Chairman, of the War Emergency Committee of the Institution, who responded, said: I must first of all express our thanks to Sir Charles Craven for proposing this Toast, and, in welcoming him as our new Honorary Member, I will, for the sake of completeness, inform him of the name of the third of our Honorary Members, our old friend Sir Alfred Herbert.—(*Applause*).

I must confess to a little surprise that our President, Mr. Bailey, was so reticent. He offered no criticisms, constructive or otherwise, and the dove of peace found an unfamiliar perch on his shoulder; clearly his sense of propriety overcame his normal feelings! Criticism is a strange thing. When we make it ourselves, we can hardly understand the stupidity or blindness from which the object of our criticism suffers, that he should not be able to understand how stupid he is and how differently he should act; but when we are the subject of criticism, we feel most impatient with the critic, that he should know so little of what he is talking about.—(*Laughter*) Certain it is that if you want to know how a factory should be run you generally inquire of labour or of one of the supply Ministries, while if you want to know how one of the supply Ministries should be run, you inquire of management or of labour—or, if you like, of the Institution of Production Engineers. But do not go to the man in charge of any job if you want to know how it should be run or how it is going—as if he could tell you!

The Institution and Government Departments

Following precedent, then, it is perhaps natural that the Institution has, in the course of a great deal of real effort over the last eighteen months, attempted the solution of a number of the Government's knottiest production problems. The only difficulty has been

to convince the occupants of key Government jobs that these solutions are any good. Actually it must be admitted that one or two of our notions have been adopted—usually in the twelfth or thirteenth month after first submission (*laughter*),—and so we are appeased, or even a little apprehensive in case the d.....d things do not work out too well '—(*Laughter*).

After all, we in our democracy have to choose between criticism and "yes-men," The Nazis choose the principle of yes-men, with the corollary of the concentration camp for critics ; we have chosen the principle of freedom of criticism, and we shall win the war on that footing.—(*Applause*). It must be our business as an Institution to see that our criticisms are based upon and aimed at helping the man or the job in trouble. Criticism allied with knowledge and sympathy can be a great force for advancement, but without those added qualities it is nothing but a nuisance.

It is nowadays the policy of the Government to provide in each works for a channel of consultation between management and labour, a provision which is aimed. I venture to think, not so much at ensuring to labour just treatment or the establishment of its rights as of encouraging mutual understanding. Now, this occasion is our one opportunity for consultation with the production departments of the Government. We do not overlook for one moment that august body, the Joint Advisory Committee of the Production Executive of the Cabinet, and the directors, financial and legal experts and high business executives who represent the employers on it have our sincere esteem and regard, as have also the trade union representatives ; but this is *our* one opportunity on our own level to consult jointly with our opposite numbers in the production departments of the Government, and it is an opportunity which we welcome and should like repeated.

The Tool Bottleneck

Sir Charles Craven has asked us to bring more and more women into the workshops. We must all agree with him that there are now very few men left, although when a friend of mine recently advertised for a "female chaser" there were numbers of male applicants. —(*Laughter*). It is precisely upon the production engineer that the work falls in extending female labour. There are few jobs which will not yield, at least in part, to re-tooling or rearrangement of methods, falling under that dreadful term, "de-skilling." Some of the tardiness in reaching finality in this direction however, is still due to the tool bottleneck, which remains the back marking feature in most engineering production.

We welcome the steps now in hand for the pooling of cutting tools, but we hope that no-one will think that this is enough. Tool capacity must be made to beat production capacity, and until

it does the tool load will put a brake on the absorption of women, because of the greater tool demand which is created. The other chief limitation is imposed by the shortage of machine-setters. More women mean more setters, and much of the setters' training does and must fall upon individual works. We must all do more and more to help in this direction. We nevertheless feel strongly the necessity of allocating a quota of suitable machine tools to the Ministry of Labour training schools, so that they too can undertake much of the preliminary training of setters. Such a policy would appear to be a better investment than to have machine tools idle for lack of setters.

I should like to commend to my colleagues the possibilities in all sorts of directions of arranging part-time work for women, From personal successful experience of some hundreds of women working either a morning shift or an afternoon shift, which fits in with domestic duties, I believe that there is great scope for such plans. It is at all events the one category in which my company is blessed with a long waiting list.

Clearing Centres and Regional Boards

There is one other commendation which I should like to make, and that is in connexion with the District Clearing Centres, which have made such a good start in the London area and in some others. So much can be done by local groups. The local reconstruction panels are shining examples of the truth of this, and every factory which works closely in touch with its local clearing centre has means to contact with spare capacity and with work to fill up the odd corners, as well as all kinds of other kelp. Give the centres your practical support, for they are worth it, and some day—who knows?—perhaps the Government will give the Regional Boards a little real authority to back up the voluntary support on which they must now depend.

In conclusion, let me say that we as an Institution are most fortunate in having to hand an utterance of our great Prime Minister which we can take as our own. For us, more than for most people, it is proper to make the demand, "Give us the tools and we will finish the job."—(*Applause*).

THE PRESIDENT.

The President : That concludes the proceedings but I should like to say to the members of the Institution present here that these are days of recognition of the production engineer. Let us see to it that we justify the confidence which is placed in us. I, as your President, have every confidence that our members will respond to this great effort, and I am proud to be your President. Thank you very much.—(*Applause*).

THE INSTITUTION OF PRODUCTION ENGINEERS

Founded 1921 Incorporated 1931

ANNUAL REPORT

of the Council, and Annual Accounts, for the Year ended June 30th, 1941

also

SECOND ANNUAL REPORT

of the Executive Committee of the Research Department, and Annual Accounts of the Department for the same period

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Published by the Institution ; 36 Portman Sq., London, W.1
'Phone Welbeck 2233

ANNUAL REPORT OF THE COUNCIL FOR THE YEAR ENDED 30th JUNE, 1941

THE year under review has been one of the most eventful in the history of the Institution. There have been numerous interesting developments in connection with the war-work of the Institution, as well as in its work in educational and other fields of activity. Brief mention is made in this Report of the more important of these developments.

Membership

The membership at the end of June, 1941, was as follows :—

Honorary Member	1
Ordinary Members	768
Associate Members	916
Intermediate Associate Members ...	238
Graduates	433
Students	113
Associates	39
Affiliates (representing 107 Affiliated Firms,) less those already in other grades	79
	2,587

Three hundred and thirty new members were added to the register during the year, eleven members died, twelve resigned, and thirty-six lapsed. The members whose decease has to be recorded with regret include our Past-President, Lord Austin, whose work for the Institution is dealt with elsewhere in this Report; Mr. H. C. Armitage, Chairman of the Executive Committee of our Research Department, who was a Founder Member of the Institution and served for many years on our Council; Mr. H. B. Pratt, late President of the Southern Section; and Messrs. F. Brown (Associate Member), H. T. Edison, (Member), W. A. Fraser, (Member), J. R. Garner, O.B.E., (Member), P. Lamerton, (Member), J. G. Olsen (Graduate), R. W. Spiller (Member), and E. Farrar-Taylor, (Intermediate Associate Member).

Finance

The audited accounts for the year ended June 30th, 1941, presented with this Report, show that the finances of the Institution continue to be satisfactory. The surplus of income over expenditure for the year was £631 1s. 7d., after transferring £1,050 to a Fund for Building and Development, and £100 to a Dilapidations Reserve.

Since June 30th, the £8,175 2s. 6d., 3¼ per cent Canada Registered Stock 1958-63, shown in the Balance Sheet, has been requisitioned by the Government. The Stock was bought at $97^{11}/_{16}$ per cent and the market price paid by the Government was £104 2s. 5d. per cent. The Institution's Trustees have re-invested the proceeds in Canadian Pacific Railway 4 per cent Perpetual Debenture Stock.

The Late Lord Austin

The death on May 23rd, 1941, of our distinguished Past-President, Lord Austin, has meant the loss, greatly to be deplored, of a valued friend and leader. Up to the time of his death, he had served on the Council for 10 years and always took the liveliest interest in the work of the Institution, of which he was President, 1931-33. He never failed before and during those 10 years, to attend and speak at our Annual Dinners, and was foremost in advocating the establishment of our Research Department. The Institution is proud to support the memorial to him inaugurated by Lord Nuffield, one of his successors as President and his colleague on our Council.

The Trustees of Lord Austin's estate have kindly presented an oil painting of him to the Institution to add to our collection of portraits of Past-Presidents, which include a portrait, in oils, of Lord Nuffield painted earlier this year by the same artist, Mr. Philip Naviasky, and kindly presented to the Institution by a group of members who served as Vice-presidents under Lord Nuffield's Presidency.

Honours Conferred on Members by the King

We are pleased to record that during the year His Majesty the King has conferred honours on seven members of the Institution, including five of our colleagues on the Council, as follows : Mr. G. E. Bailey, (President) : C.B.E., The Viscount Nuffield, (Member of Council), G.B.E. Mr. E. W. Hancock, (Member of Council, M.B.E. Mr. W. A. Harriman, (Vice-President), M.B.E. Captain C. W. Mustill, (Vice-President), M.B.E. Sir Charles N. McLaren, (Member), K.C.B. Mr. N. Rowbotham, (former Vice-President), C.B.E.

Work of the War Emergency Committee

In this war of production there are few busier men in the country than production engineers, but "it is the busiest men who can always find time to do a little more," and our War Emergency Committee has continued to follow the dynamic policy which it shaped at its inception. Situated as it is, receiving correspondence from members of the Institution on production matters, it is particularly well placed to estimate the importance of different phases of the organisation of the concerted production drive. It has endeavoured to continue its policy of putting forward constructive suggestions towards the solution of the major production difficulties which it has found to persist.

In January, 1941, the War Emergency Committee published its memorandum on the Efficient Utilisation of Labour. This received wide circulation at the request of the Ministry of Labour. The Institution has also provided a platform for Mr. B. C. Jenkins, who, while serving as Chief Inspector of Munitions Labour Supply, addressed meetings at ten of the Institution Sections on this topic. In all some 2,500 production executives attended these meetings, and the total contribution to the encouragement of a progressive policy in training and upgrading, together with the all important phase of planning away from skilled labour, has been of no small importance.

A matter which the War Emergency Committee felt to be of paramount importance was the tool supply situation, particulary in the case of small tools and equipment, and a memorandum on this subject was addressed to Mr. Harold Macmillan in January last. The object of this memorandum was to urge upon the Government the need, not so much for new lines of action towards the solution of this most serious production bottleneck, but the need for much more action along lines which had already been started. Following the presentation of this report, an informal deputation discussed the matter with Sir Harold Brown and members of his staff and, later, a formal deputation was received by Mr. Harold Macmillan. While these deputations took place on a very friendly footing and no doubt served some purpose in convincing these gentlemen of the importance we attach to this problem, the Committee is not of the opinion that the action taken is yet anything like sufficient to meet the situation.

The Committee received approaches from various Government officials who were seeking advice on specific difficulties and the stage was reached at which it was felt necessary to recruit more assistance in handling the problems than could be rendered by the hard-worked members of the W.E.C. It was consequently decided

to address a questionnaire to the Members and Associate Members of the Institution inviting them to volunteer to give " spare-time " assistance in dealing with such problems, and also asking them for particulars of their special experience such as would enable an intelligent job to be done in directing enquiries into the most expert channels for attention. The response to this invitation was all that could be desired and over 500 Members and Associate Members replied favourably.

With such a response it was felt possible to tackle the question which had always been much upon the Committe's mind, namely, the establishment of a technical " mutual aid service " as between the Institution's own members. This would not in any way prevent the use of our register for direct Government help, but the assistance given to production through the availability of technical information and advice to members would, it was felt, be even more important and beneficial to the country than a limited co-operation with scattered Government Departments. It was recognised early on that a corollary to such a technical service would be a modification of the Institution's series of publications, and it was accordingly arranged for a Technical and Publications Committee to handle the organisation of this service by the supervision of the Institutions' publications. This venture is already well afoot and in active operation. Although it may take members a little time to accustom themselves to the existence, so to speak, of consulting engineering advice made available to them in the interests of the country's war time effort, the early signs portend a great success for this innovation.

With the active co-operation of members, which will no doubt be available, it is expected that the new form of the Institution's Bulletin, now called " Technical Bulletin," will develop into a most important part of the Institution's war work.

Among many other activities one is worth a special mention. The experience of the Institution in representing the views of members on specific war production problems has so far been that it is difficult to reach the right ears in Government circles. The Government naturally follows the most constitutional procedure in seeking advice, and while, on purely engineering topics, the standing of the Institution is sufficient to gain it a hearing, this has not proved to be the case on matters of policy in production. In such circumstances the Government approach is to a properly constituted body which is representative of industry rather than to a scientific body such as the Institution.

Recently, therefore, the Institution decided to make a recommendation to the Federation of British Industries advising it

to set up a Production Committee which would, because of the representative standing of the F.B.I., carry more weight in putting forward any recommendations to the Government. This suggestion has been adopted and the F.B.I. Production Committee has been formed. Two members of the War Emergency Committee, its Chairman, Mr. N. V. Kipping, and Mr. J. D. Scaife, Past-President of the Institution, were appointed to serve on the F.B.I. Committee, but Mr. W. Puckey, Chairman of the Technical and Publications Committee, has replaced Mr. Scaife on account of the latter's appointment as Director of Ball Bearing Supplies at the Ministry of Supply. The Institution will thus be assured of a voice in the topics and recommendations which are dealt with.

The past year has seen much useful work carried through and progress made. The Committee enters upon the new year expecting benefit from the ground work so far laid, hoping thereby to make faster progress in the future. The vital need now is for each individual member of the Institution to take as active a part as possible in support of the war effort which our Institution, through its various Committees, is undertaking.

The Technical and Publications Committee

This Committe, since its inception in May, 1941, has held weekly meetings at Headquarters and has spent many hours endeavouring to organise in a detailed sense the considerable volume of enquiries, correspondence, articles, and suggestions made available through many channels.

Briefly, these activities fall under the following main headings:—

(*a*) To answer membership enquiries on all subjects connected with production engineering. These enquiries may be answered direct or through the medium of other known sources of information. (*b*) To give publicity, through our new publication—THE TECHNICAL BULLETIN—to all short contributions of a suitable character within the scope of production engineering that are received from members or other sources. (*c*) To take over, until further notice, the work of the Papers Committee and to give publicity, through THE JOURNAL, to papers, lectures, or discussions of a suitable nature. (*d*) To co-operate with the Government and other bodies with a view to assisting the national effort in the field of production engineering.

There has been a steady stream of enquiries on many subjects. While the Committee is doing its best to answer those satisfactorily, it must rely on other members with more specialised experience in many cases, and a tribute is due to all who have willingly responded in such cases.

The first few numbers of THE TECHNICAL BULLETIN have been well received. The Committee is endeavouring to build up a series of articles on subjects such as "Designing for Production," "Air Raid Precautions in relation to the Production Engineer," etc. It is thought that a development of the various principles underlying certain major production engineering problems is the best general approach, and members with specialised experience under the broad headings chosen have been, and will be, invited to contribute their experience.

It is gratifying to know that several Local Sections are arranging lecture programmes for next session. The Technical and Publications Committee will endeavour to find lectures on subjects of interest to Local Sections, if requested.

The Committee's activities under (*d*) have covered a wide field, including collaboration with the following bodies :—The Eastern Regional Board (Ministry of Supply), the Southern Regional Board, (Ministry of Supply), the Ministry of Aircraft Production, the Ministry of Supply, the Advisory Service on Welding (Ministry of Supply), Directorate of Jigs and Tools (Ministry of Supply).

Fuller details of these contacts have been, and will be, published in the THE TECHNICAL BULLETIN from time to time. Every effort is being made to give those many members and Local Sections Committees desirous of assisting in the work full opportunity of doing so.

Another useful development, capable of even greater use, is that of circularising selected members in connection with the compilation of statistics on various production engineering problems. A few interesting examples have already arisen, and where members and official bodies have problems of general interest to deal with the Committee is prepared to co-operate as far as possible.

Educational

The outstanding educational event of the year under review, not only from the point of view of the Institution but from that of engineering education generally, has been the inception at long last of a Higher National Certificate in Production Engineering. It is nearly eight years since the Institution first approached the Board of Education on the subject. Great and sustained effort has been required to bring about this much-needed reform, the importance of which it would be difficult to overstress. The Institution is indebted to Lord Nuffield and Lord Sempill for their energetic action in support of the reform, and also to the zeal in the same cause shown by the members of our Education Committee and the Joint Examination Board, as well as by several leading Members of Council. The grant of this Certificate represents a big achievement,

which may be expected to have a far-reaching influence on engineering education in this country after the war.

Concurrently with the establishment of the Higher National Certificate in Production Engineering, arrangements have been made with the Institution of Mechanical Engineers, the Board of Education and the Scottish Education Department for Ordinary National Certificates in Mechanical Engineering, which contain approved production engineering subjects, to be countersigned on behalf of our Institution by our President.

In place of the usual Graduateship Examination at Easter this year, plans were made for candidates to sit for substitute internal examinations arranged by various Colleges. This was owing to the inevitable dislocation of normal courses because of war necessities. The Council thanks those Technical Colleges which co-operated with the Institutions in these plans.

Research Department

The Second Annual Report and Accounts of the Institution's Research Department are presented to members together with this Report. In spite of the difficulties created by war conditions it is satisfactory to note that the work of the Research Department has continued without interruption, and that the second stage of the investigation into the important question of Surface Finish has now been completed. The results of this research are to be published within the next few weeks.

Members will be pleased to know that, following an agreement entered into with the Board of Inland Revenue in June, 1941, subscriptions from firms given to the Institution for research can be treated by the contributing firms as a trade expense. This will greatly facilitate the task of securing adequate financial backing for the development of our research work. Particulars of the arrangements entered into with the Inland Revenue authorities will be found in the Annual Report of the Executive Committee of the Research Department.

Standardisation

A considerable time ago the British Standards Institution carried out a re-organisation of its Committees dealing with Precision Engineering. Our Standards Committee kept in touch with this work, and they and other members of our Institution co-operated with the B.S.I. in pushing it forward, Mr. J. E. Baty's contribution in particular being of special value.

Arising out of this collaboration, and in response to requests from our Institution, the following British Standards have been

prepared and issued by the B.S.I.—B.S.957, 1941, Feeler Gauges, B.S. 958, 1941, Precision Levels for Engineering Workshops, B.S. 959, 1941, Internal Micrometers. There has also been a war-time issue of B.S. 164, 1924, Limits and Fits for Engineering, with revised and simplified text. The B.S.I., on the recommendation of our Institution, set up a Technical Committee to consider the revision of this Standard, but it has not been considered desirable to make any important change in it during the war.

Local Section Activities

War conditions and the consequent pressure of work on members throughout the country have inevitably curtailed the number of lecture meetings at most Local Sections throughout the country last session. In many centres the black-out problem has been met by holding meetings earlier on weekdays and sometimes Saturdays or even Sundays. Many very successful lecture meetings have, however, been held, notable amongst them being the nine gatherings of members at which our colleague on the Council, Mr. B. C. Jenkins, while Chief Inspector of Munitions Labour Supply at the Ministry of Labour and National Service, gave his paper on "The Utilisation and Training of Labour under War Conditions." Another specially interesting occasion was the joint meeting with the Institution of Mechanical Engineers for a discussion on "The Desirability of Acceptance Test Charts for Machine Tools."

Section social functions have, on the whole, been well maintained and have provided a much-needed relaxation from the strain of war work.

Formation of North Eastern Section

A new Local Section of the Institution to be known as the North Eastern Section, was formed at Newcastle-on-Tyne in March, 1941, when Mr. W. A. Harriman, M.B.E., was elected first Section President, with Mr. J. Nicod as Hon, Secretary. The section has held some very successful lecture meetings and, through its president, was instrumental in arranging an important conference of educationalists and leading industrialists to make adequate provision for Production Engineering Courses at Technical Colleges in the North East.

Statutory Definition of a Production Engineer

In July, 1940, a Statutory Order—which has the same force as an Act of Parliament—was issued in connection with the compulsory registration of specified classes of persons, and a schedule to this Order contained the following definition of a production engineer :—

"A production engineer, that is to say a staff engineer who

normally holds in any engineering works a position of authority involving responsibility for executive management or control, above the rank of foreman, of any technical function pertaining to production."

Schedule of Reserved Occupations

The Schedule of Reserved Occupations for a long time contained a list of "Professional Engineers" which did not include Production Engineers. As a result of representations made by the Institution, this anomaly has been removed and they have been included in the list as reserved at the age of twenty-five.

The Central Register

The Institution has taken an active part in the operation of that section of the Central Register which has to do with production engineering. Over a lengthy period representations were made on behalf of the Institution designed to improve the working of the register, but these proved unavailing, and perhaps we are not alone in holding the view that the Central Register is one of the least successful of the Government's enterprises.

The registration of professional engineers being compulsory, it may be interesting to record the totals on the Central Register under the following main classifications at the end of August, 1941 :

Production Engineers		12,077
Mechanical	,,	24,555
Electrical	,,	30,307
Automobile	,,	4,631
Marine	,,	4,862
Aeronautical	,,	3,183

The figures for production engineering, however, cannot be taken as an exact guide, since production engineers are to be found under most of the other main classifications mentioned.

September 26th, 1941.

BALANCE SHEET AS AT 30TH JUNE, 1941

LIABILITIES.	£	s.	d.
SUNDRY CREDITORS:	434	0	9
SUBSCRIPTIONS RECEIVED IN ADVANCE	49	11	9
THE VISCOUNT NUFFIELD GIFT 24000 0 0			
THE LORD AUSTIN PRIZE FUND 52 10 0			
HUTCHINSON MEMORIAL FUND 37 12 6			
	24090	2	6
LEASEHOLD PREMISES SINKING FUND .	381	10	0
BUILDING AND DEVELOPMENT FUND .	1050	0	0
DELAPIDATIONS RESERVE ACCOUNT ...	100	0	0
INVESTMENTS RESERVE ACCOUNT ...	206	1	1
INCOME AND EXPENDITURE ACCOUNT:			
Balance at 1st July, 1940 ... ... 6970 7 6			
Add Excess of Income over Expenditure for the year 631 1 7			
	7601	9	1
RESEARCH DEPARTMENT:			
Sundry Creditors	127	17	9
Amount due to Head Office per contra	250	0	0
Balance of Income and Expenditure Account	1490	19	8

ASSETS.				£	s.	d.
LEASEHOLD PREMISES at cost ... (Depreciation is provided by a Sinking Fund).				3481	0	0
FURNITURE, FITTINGS AND PLANT at cost, *less* amount written off:						
Balance at 1st July, 1940			567 8 5			
Additions during year			4 19 6			
			572 7 11			
Less amount written off			120 1 11			
				452	6	0
INVESTMENTS at cost:						
£7269 13 8	5% Conver. Stk. 1944-64		8000 0 0			
8389 9 6	3% National Def. Stock 1954-58 ...		8000 0 0			
8175 2 6	3¼% Canada Reg. Stock 1958-63 ...		8000 0 0			
588 3 0	Plym'th Cor. 3% Redeem. Stk. 1956 ...		591 18 6			
625 17 1	Ayr County Council 3% Red. Stock, 1956 ...		630 9 6			
600 0 0	London Cty. Con. 3% Stk. 1956-61 ...		603 17 0			
129 5 6	3% War Sk. 1955-59 ...		130 3 3			
				25956	8	3

			Con. 3% Sk. 1956-61 ...	603 17 0	
129	5	6	3% War Sk. 1955-59 ...	130 3 3	
					25956 8 3
£25777	11	3	(Market value £26609).		
			BUILDING AND DEVELOPMENT FUND INVESTMENT (loan to H.M. Treasury free of interest)		1050 0 0
			LEASEHOLD PREMISES SINKING FUND POLICY		381 10 0
			SUNDRY DEBTORS AND DEPOSITS ...		769 10 5
			SUBSCRIPTIONS IN ARREAR, *not valued*		—
			CASH: At Bank... ...	548 13 5	
			At Post Office Savings Bank	1000 0 0	
			In Hand	23 7 1	
					1572 0 6
			AMOUNT DUE FROM RESEARCH DEPARTMENT per Contra		250 0 0
			RESEARCH DEPARTMENT: Laboratory Plant and Furniture at cost, *less* amount written off		546 6 7
			Payments in advance		23 16 4
			Cash at Bank and in hand		1298 14 6
					£35781 12 7

AUDITORS' REPORT.—We have audited the above Balance Sheet dated 30th June, 1941, and we have obtained all the information and explanations we have required. In our opinion such Balance Sheet is properly drawn up so as to exhibit a true and correct view of the state of the Institution's affairs according to the best of our information and the explanations given us, and as shown by the books of the Institution.

Aldwych House, London, W.C.2.
24th September, 1941.

(*Signed*) GIBSON, APPLEBY & CO., Auditors,
Chartered Accountants.

G. E. BAILEY,
President.

N. KIPPING,
Chairman of Council and Finance Com.

R. HAZLETON,
General Secretary and Treasurer.

THE INSTITUTION OF PRODUCTION ENGINEERS

Income and Expenditure Account for the Year Ended 30th June, 1941

Dr.

	£	s.	d.
To Salaries	1712	2	6
„ Rent, Lighting, Heating and Cleaning	447	10	1
„ Local Section Expenses	201	13	5
„ Printing, Postages, Stationery, Telephone and Certificates	571	6	8
„ Cost of Journal and Bulletin ...	1683	0	9
„ Travelling and Expenses of Meetings other than Section Meetings ...	106	9	0
„ Professional Charges and Insurances	96	11	7
„ Donations to other organisations ...	10	0	0
„ Repairs and Renewals	60	2	3
„ A.R.P. Fireguard Expenses ...	65	0	0

Cr.

				£	s.	d.
By Subscriptions received :						
Current	4762	0	6			
Arrears	84	10	0			
				48	6	10	6
„ Interest on Investments				921	12	3
„ Journal receipts				2325	10	7
„ Contributions received for Research ...	1121	0	0			
„ Other Research receipts	345	12	10			
				1466	12	10
„ Transfer due from Research Account for Management Expenses ...				250	0	0

„ Miscellaneous	22	15	6
„ Transfer to Leasehold Premises Sinking Fund	127	3	4
„ Transfer to Delapidations Reserve Account	100	0	0
„ Transfer to Building and Development Fund	1050	0	0
„ Amount written off Furniture, Fittings and Plant	120	1	11
„ Amount transferred to Research Department Account	2805	7	7
	9179	4	7
„ Balance, being Excess of Income over Expenditure	631	1	7
	£9810	6	2

	£9810	6	2

RESEARCH DEPARTMENT

Second Annual Report and Accounts for the Year Ended 30th June, 1941, presented by the Executive Committee of the Department

THE past year has been an anxious and difficult one, but we are pleased to be able to report that in spite of this much useful work has been accomplished. In November, 1940, our Director, Dr. Schlesinger, met with a serious accident which incapacitated him for a considerable time and unavoidably hampered the work of the department. Development was also delayed pending the completion of an agreement with the Board of Inland Revenue which would enable subscribing firms to treat their contributions to our research work as a trade expense. Until that issue was favourably settled we did not feel justified, under present conditions, in asking firms for financial support. It was not settled till within a month of the close of the financial year. Up to that time, subscriptions for the eleven months had amounted only to £45, and it looked as if a serious deficit for the year would have to faced. The agreement, however, came just in time to enable this to be avoided. Between June 10th and June 30th, 1941, subscriptions amounting to £1,076 were received, enabling the department to balance its accounts for the year without calling on its reserves. There is already evidence that the financial position for the coming year will be much more favourable, though the uncertainties of conditions, due to the war, will make it imperative to pursue a policy of strict economy. The grant from Institution funds for the year was £1,339, compared with £1,276 the previous year.

Agreement with the Board of Inland Revenue

The agreement with the Board of Inland Revenue, having been approved by this Committee, was ratified by the Council of the Institution on behalf of the Research Department at its meeting on June, 20th, 1941, We think it important that members of the Institution and subscribing firms should be fully acquainted with the main heads of the arrangement arrived at and therefore we give the following extract from a report on the subject by Mr. Hazleton, General Secretary to the Institution, submitted to us and to the Council of the Institution, and dated June 14th, 1941:

"The position, as settled at an interview I had with the Inland Revenue representatives on May 30th, is now as follows :—

(*a*) Until such time as our Research Department becomes an approved body by the department of Scientific and Industrial Research, our Research Committee, acting on behalf of the Institution, shall enter into an agreement with the Inland Revenue undertaking to pay tax on such portion of the Committee's annual surplus, if any, as may be held by the Inland Revenue to be liable to tax, in accordance with the Rules of case I, Schedule D, Income Tax Act, 1918. In computing surplus for this purpose, grants made to the Research Committee by the Institution will not be taken into account. As grants from the Institution have hitherto exceeded the total of any surplus, no tax liability has so far arisen.

(*b*) If and when the Research Department becomes approved by the Department of Scientific and Industrial Research, and the Inland Revenue is informed by the D.S.I.R. of the fact, liability to pay tax on surplus will cease and the concessions ordinarily allowed to approved Research Associations will apply.

(*c*) Subject to (*a*) above, we are authorised to inform contributing firms that they are entitled to treat their annual contributions as a trade expense, but this does not apply to individuals, such as salaried persons, whether members of the Institution or not."

Approach to the D.S.I.R.

It will be noted that, as outlined in the extract from the General Secretary's report on the preceeding section, liability to pay tax on surplus will cease if and when our Research Department becomes approved by the Department of Scientific and Industrial Research. That being so, it is intended to make an approach to the Council of the Department of Scientific and Industrial Research to ask for such approval and to ascertain the terms and conditions under which a grant-in-aid of our research work from that body can be obtained. We have reason to believe that at one time the D.S.I.R. held the view that we would have to show an income of either £7,000 or £10,000 a year for research before a grant-in-aid could be entertained. In present circumstances it is to be hoped that there will not be rigid adherence to either of these figures. We note, for instance, that in the published accounts of the Institute of Welding for the year ended December, 31st, 1940, the

grant-in-aid from the D.S.I.R. was £2,276 8s. 4d., while the Institute's subscription income for research was £3,904.

Quite apart, however, from any question of a grant-in-aid, recognition by the D.S.I.R. is of great importance, since our Research Department is liable, until recognition is given, for taxation on surplus income for each year in excess of the grants it receives from the Council of the Institution. This would mean an effective bar against the accumulation of funds for research. Under such conditions, if large contributions were received, your Committee would have no alternative to either spending them at once or surrendering them in taxation. If, for instance, in the coming year our surplus amounted to £8,000 more than the grant received from our own Institution, most of this surplus would have to be surrendered in taxation.

Subscriptions

We have to acknowledge with thanks the following subscriptions for research received up to the date of the issue of this report :—

	£	s.	d.
Austin Motor Co. Ltd.	250	0	0
English Steel Corporation, Ltd.	250	0	0
Thos. Firth and John Brown, Ltd.	250	0	0
British Thomson-Houston Co. Ltd.	250	0	0
Hoover, Ltd.	250	0	0
Metropolitan-Vickers Electrical Co. Ltd. ...	250	0	0
Associated Equipment Co. Ltd.	100	0	0
Climax Rock Drill and Engineering Co. Ltd.	100	0	0
Murex, Ltd.	100	0	0
Newton Chambers, Ltd.	100	0	0
Parnell Aircraft, Ltd.	100	0	0
Standard Telephones and Cables, Ltd. ...	100	0	0
Vauxhall Motors, Ltd.	100	0	0
Catmur Machine Tool Corporation, Ltd. ...	52	10	0
George Bray and Co. Ltd.	50	0	0
David Brown and Sons (Hudd) Ltd.	50	0	0
B.S.A. Tools, Ltd.	50	0	0
Cutanit, Ltd.	50	0	0
Humber Ltd.	50	0	0
Leyland Motors, Ltd.	50	0	0
A. C. Wickman, Ltd.	47	10	0
G. Beaton and Sons, Ltd.	26	5	0
John Lund, Ltd.	26	5	0
Mollart Engineering Co. Ltd.	26	5	0
Dennis Bros., Ltd.	25	0	0
Carried forward ...	£2,703	15	0

Brought forward	£2,703	15	0
Hepworth and Grandage, Ltd.	25	0	0
George Kent, Ltd.	25	0	0
E. Pryor & Sons	20	0	0
A. Partridge and Co. Ltd.	10	10	0
W. P. Butterfield, Ltd.	10	0	0
Black and Decker, Ltd.	10	0	0
R. Ely (Member)	5	5	0
A. E. C. Gregg (Member)	2	10	0
W. F. Clark (Associate Member)	1	3	0
T. A. Stoddart (Member)	1	1	0
W. J. Smith (Member)	1	0	0
N. Davis (Associate Member)		10	6
L. Archer (Student)		10	0
B. S. Lewis (Graduate)		10	0
	£2,816	14	6

Of the above total of £2,816 14s. 6d. the amount received within the financial year ended June 30th, 1941, was £1121, as shown in the accounts, the remainder forming part of revenue for the coming year.

Research Work during the Year

The main activities of the Department during the past year have included research on the following subjects :—

(1) Surface Finish, (2) Single Point Cutting Tools, (3) Acceptance Test Charts for Machine Tools, (4) Twist Drills, (5) Cutting Oils, (6) Design of Taps, (7) Efficient Use and Maintenance of Machine Tools.

(*a*) Surface Finish

Since the publication of the Preliminary Report (Institution Journal, Vol.XIX, No. 3, March, 1940,) extensive research, including the use of newly developed electrical and optical instruments, has enabled the Research Department to prepare proposals for a British Standard of Surface Finish. All available British and foreign instruments for the measurement of surface finish were used in a thorough investigation of many hundreds of surfaces selected from representative sections of British industry. The suitability of quantitative definition of surfaces using various parameters, and of qualitative description by means of visual observation, photography or graphical records, was investigated in detail so that the most suitable parameter could be selected as the basis for the proposed British Standard. Throughout the research close contact has been maintained between the Research Department

and firms selected as representative of important sections of British industry so that the practical aspects of the subject have been kept to the fore. In addition the Department has kept in touch with surface finish developments in the U.S.A. The detailed results of this research are being embodied in a comprehensive report which will be published by the Institution during October or November, 1941.

(*b*) Acceptance Test Charts for Machine Tools

Part I of "Acceptance Test Charts for Machine Tools," prepared by the Research Department, was published by the Institution jointly with the Institution of Mechanical Engineers in March, 1940. That publication included acceptance tests for the following six first-grade machines :—(1) Centre lathes, up to 16 in. swing, (2) Knee type horizontal and universal milling machines, (3) Vertical milling machines, (4) Horizontal slab milling machines, (5) External grinding machines, plain and universal, (6) Radial drilling machines. Part II of "Acceptance Test Charts," which will shortly be published, includes tests for the following seven first grade machines:—(1) Capstan and combination turret lathes, (2) Single and (3) Double standard vertical boring-mills, (4), (5), (6) and (7) Surface grinding machines with horizontal and vertical axes. Part III of the series of test charts is now in preparation.

It is significant that the National Machine Tool Builders Association of America recently published the first of a series of Acceptance Test Charts similar in form to those adopted by the I.P.E., and prescribing tolerances which hardly differ from those prescribed by the Research Department.

Several factors directly connected with acceptance tests have been referred to the Research Department for clarification. Subsequent investigations led to the issue of the following reports :—(1) "The Dial Gauge and its Use," (*see* THE JOURNAL of the Institution, Vol. XVIII, No. 11, November, 1939), which describes test of dial gauges and introduces special rigid dial gauge holders. (2) "The Natural Sag of Test Mandrels," (THE JOURNAL, Vol. XX, No. 1, January, 1941), which gives the effect of the sag of mandrels on alignment tests. (3) "The Influence of Warming Up," (THE JOURNAL, Vol, XX, No. 4, April 1941,) which shows the effect of temperature on alignment.

In addition to the test charts a brochure entitled "Accuracy in Machine Tools: How to Measure and Maintain It" has been published as a guide to enable makers and users of machine tools to utilise the test charts effectively on re-conditioned as well as on new machine tools.

Single Point Cutting Tools

This research covers all factors which influence the economic use of new types of tungsten carbide tools. An important factor is the maintenance of correct tool form. As previous investigators have concerned themselves mainly with heavy roughing cuts, this research has been restricted to the investigation of medium roughing and light finishing cuts. Special electrical measuring units have been developed for use in conjunction with existing dynamometers. The instruments permit the measurement of light and medium forces with much greater reliability than has hitherto been possible. Observations relating to cutting temperatures, machineability, indices of selected steels, etc., are also included in this series of investigations. Restrictions on the supply of heavy machine tools have prevented the Research Department from obtaining a lathe suitable for roughing at high speed. However, by the courtesy of the L.M.S. Railway Co. Derby, it has been possible to carry out the tests on a heavy testing lathe in their works in Derby. The results of this research will be incorporated in a report which is now being prepared for publication.

Twist Drills

Two pieces of apparatus designed in the Research Department for the accurate measurement and testing of twist drills have been made and tests have recently commenced. A fundamental of cutting tool research is the accurate production and, if necessary, reproduction, of tool forms. One instrument ensures that the twist drills used in this research are ground to the desired form, and the other is used to measure torque and thrust of the drill while in operation.

Cutting Oils

The accurate reproduction of drills and their use in a reliable torque and thrust measuring apparatus forms a basis for observing the effect of cutting oils upon machinability. A suitable hydraulic dynamometer has now been prepared and tests are to be carried out in the near future.

Design for Taps

At the request of the War Emergency Committee of the Institution an investigation into the design of taps was carried out and a report was published in THE JOURNAL of the Institution, Vol. XX, No. 6, June 1941.

Efficient Use and Maintenance of Machine Tools

Enquiries received by the Institution and its Research Department indicated that the efficient use and maintenance of older

machine tools is to-day an important problem for the production engineer. The publicaion " Accuracy in Machine Tools ; How to Measure and Maintain It " refers continually to the problems of maintenance. Other aspects of the problem are covered by an article entitled : " The Rebuilding of Old Machine Tools," (*see* THE JOURNAL, Vol. XIX, No. 10, October, 1940), and by a report entitled : " The Effect of Reversing Flat Leather Belts," (*see* THE JOURNAL, Vol. XX, No. 5, May, 1941), which shows how the power input of belt driven machines can be increased to facilitate the efficient use of modern tools.

Thanks to Supporters

Cnce again, on behalf of the Institution and its Research Department, the Committee has to thank the Board of Governors of Loughborough College for the continued use of the laboratory premises without charge, and to thank all those who, by way of contributions, gifts or loan of equipment, have helped so greatly the work of the Department.

September 8th, 1941.

THE INSTITUTION OF PRODUCTION ENGINEERS

RESEARCH DEPARTMENT

BALANCE SHEET AS AT 30TH JUNE, 1941

LIABILITIES.			£ s. d.	ASSETS.			£ s. d.
SUNDRY CREDITORS			127 17 9	PLANT AND EQUIPMENT at cost *less* amount written off			
HEAD OFFICE			250 0 0	Balance at 1st July, 1940	253 16 7		
INCOME AND EXPENDITURE ACCOUNT:				Additions during year .	333 14 3		
Balance at 1st July, 1940	1444 1 3				587 10 10		
Add Excess of Income over Expenditure for the year	46 18 5			*Less* Depreciation ...	61 11 6		525 19 4
			1490 19 8	Office Furniture at cost:			
				Purchases during year	27 3 0		
				Less Depreciation	6 15 9		20 7 3
				PAYMENTS IN ADVANCE			23 16 4
				CASH AT BANK:			
				Current Account ...	1148 14 6		
				Deposit Account ...	150 0 0		1298 14 6
			£1868 17 5				£1868 17 5

AUDITORS' REPORT.—We have audited the above Balance Sheet of the Institution of Production Engineers' Research Department dated the 30th June, 1941, and we have obtained all the information and explanations we have required. In our opinion such Balance Sheet is properly drawn up so as to exhibit a true and correct view of the state of the Department's affairs according to the best of our information and the explanations given us and as shown by the books of the Department.

Aldwych House, London, W.C.2.
24th September, 1941.

(*Signed*) GIBSON, APPLEBY & Co., Auditors,
Chartered Accountants

G. E. BAILEY,
President of the Institution

J. H. BINGHAM,
Chairman of Research Committee

R. HAZLETON,
General Secretary and Treasurer of the Institution

24th September, 1941.

(Signed) GIBSON, APPLEBY & CO., Auditors,
Chartered Accountants

G. E. BAILEY, *President of the Institution*

J. H. BINGHAM, *Chairman of the Research Committee*

R. HAZLETON, *General Secretary and Treasurer of the Institution*

THE INSTITUTION OF PRODUCTION ENGINEERS

RESEARCH DEPARTMENT

INCOME AND EXPENDITURE ACCOUNT FOR THE YEAR ENDED 30TH JUNE, 1941

	£	s.	d.		£	s.	d.
To Salaries and Wages	2092	11	11	By Grant from Institution Funds ...	1338	14	9
,, Management Expenses	250	0	0	,, Transfer from the Institution of amounts received for Research:			
,, Printing, Postages, Stationery and Telephone	52	11	1	Contributions ... 1121 0 0			
,, Travelling Expenses...	31	4	7	Bank Interest ... 3 15 4			
,, Professional Charges and Insurances	27	13	2	Fees 219 2 3			
,, Technical Publications	108	10	7	Sale of Technical Publications ... 122 15 3			
,, Laboratory Materials	106	4	2		1466	12	10
,, Repairs to Plant and Equipment ...	10	16	0				
,, Miscellaneous	10	10	5				
,, Depreciation: Plant and Equipment 61 11 6							
,, Office Furniture ... 6 15 9							
	68	7	3				
	2758	9	2				
,, Balance transferred to Balance Sheet	46	18	5				
	£2805	7	7		£2805	7	7

THE NEED FOR PRODUCTION ENGINEERING TECHNIQUE

*Address by W. A. Harriman, M.B.E., President of the North Eastern Section of the Institution**

I WOULD like to say how much I appreciate the honour you have shown me in electing me as the first President of the North Eastern Section of the Institution of Production Engineers, and I hope that I shall be able to prove myself worthy of the trust you have placed in me. The aims of our Institution are of vital interest to us all. I look upon efficient production as a means of providing for the masses more of the amenities of life.

The North Eastern Section

Some persons may ask the question "What need in there for another engineering Institution in this area when all sections of the various industries seem to be already provided for?" Well, in my humble way, I have been trying to get this Institution started on the North East Coast since 1934, when the district was in the midst of a terrible depression. I felt at that time that there was a great need for improvement in our methods of production because the whole of the press was daily giving us lists of orders which had gone to Continental manufacturers at the expense of the staple industries of this country, and particularly of this district. I, along with a few friends who held similar views on production, felt very disappointed at our failure to get a Section of the Institution started at that time. However, as you will remember, a meeting was held in the spring of this year and a decision was reached to form a North Eastern Section of the Institution of Production Engineers.

Engineering Masterpieces of the North East Coast

As I have stated on other occasions, the conservatism in the methods of production in the north is very strong. I do not know whether this is due to the climate or any other physical characteristic of the countryside, but on looking back into the last century one must be astonished by the pioneering and invention which has emanated from the North East Coast, where there have been

* Address delivered at the First Annual Dinner of the North Eastern Section, Newcastle-on-Tyne, *29 August, 1941.*

invented some of the greatest engineering masterpieces of all time which have made a profound impression on civilisation all over the world. Some of the more outstanding inventions are—

(1) The invention of the locomotive by Geo. Stephenson.
(2) The building of the iron ship by Palmer.
(3) The hydraulic ram by Armstrong.
(4) The incandescent electric lamps by Swan.
(5) The invention of the steam turbine by Parsons.

These are only a few of the inventions which have come from the North, and the achievements of workmanship of the North cannot be surpassed. Two monuments of design and workmanship which I may also mention have been the "Mauretania" and the "Sydney Bridge," yet in spite of this great inventiveness and superb design and craftsmanship only some of the products mentioned are now in production in this area.

Neglect of Production Engineering Technique

When I look back into the past and realise the number of industries which have gravitated from this to other districts I am convinced that much of this is due to the better production organisation and technique available in those districts. It is interesting to consider the large number of light industries which have been started in this area and have gravitated to the more advanced production centres. Does this not show a neglect of production engineering technique here ?

A careful study of the biographies of the great engineers of the past century shows us that they were all practical or production engineers in the first place, and were all travelling along the rough road of pioneering and development. At the same time there was a lack of technical guidance in the profession. I think it was the realisation of this factor which caused them to band themselves together to pool their different experiences with a view to sharing the various technical aspects of the different branches of engineering and to create a scientific basis for the control of the products of their labours. The step then taken has had a very far reaching effect on the technical side of the industry, and this technical application, coupled with the practical or production knowledge possessed by these men, was of undoubted value to the engineering industry. While engineering needs technical investigation to the utmost limits, it must not be lost sight of that production also needs a science carried to a similar degree.

Now this is where the value and need of our Institution comes in. It caters, not as many think, for education in purely mass production methods, but also in the production of the individual pieces of apparatus, whether they be in connection with an engine,

a forging, a casting or any other piece of light or heavy engineering. The Institution is concerned with improving the methods of production and the education of the personnel employed in the small firm as well as in the large firm. I think one can say that production engineering means that it aims always at producing goods in the best and the cheapest possible manner, always by scientific methods and not by undercutting rates of pay or wages. I feel that the lack of this production mentality was one of the causes why we could not compete in the world markets during the depression preceeding the war.

Economical Manufacture

The science of production engineering can help the country in the present state of emergency, but the greater benefit will be felt when the world's markets are once more happily open for international commerce.

The work of the production engineer begins after technical consideration has been given to the projected product and he then has to decide how the product shall be manufactured. His task is simplified if the designer has thought of all the saving that can be made at this time. The result is the production of a competitive article.

As an example I have taken out of the paper set at our Graduateship Examination held in March, 1940, one of the questions to illustrate my point. It is question (2) of the paper on Workshop Practice and Processes, and reads as follows : "The part shown in figure (1) is capable of modification to facilitate manufacture. Suggest suitable modifications. Describe the nature of the economies which will be effected by the suggested alterations."

The drawing shows many points which are obvious to production men. I have, in the course of my work, received many similar drawings from the designers, but had they studied such a question as this during their technical education, there would not have been, as sometimes happens, friction between the design department and the works.

Technical Education in Production Engineering

We are in touch with the Education Authorities in this area, and are trying to influence technical education here so that it will include a production bias for the student who wants to qualify for a position in the design or drawing office, the tool drawing office, or any of the other executive departments connected with a modern works. For the apprentice fitter and for apprentices in other trades we are endeavouring to get trade classes established such as already exist in the Midlands and other places, so that we may keep the young enthusiastic apprentice—because he is always

enthusiastic in his first years—interested in the technical side of his trade.

I wish to thank you, gentlemen, for your presence here to-night. I feel sure that the support you have given me augurs well for the future, and I shall feel perfectly satisfied if I close my term of office with a membership of three figures. Our present membership has already reached the 60 mark.

It has been particularly gratifying to me to have the support of Mr. P. L. Jones of the "Mechanicals," and Mr. W. A. A. Burgess "Electricals," but regret that Mr. Woodeson of the North East Coast Institution of Engineers and Shipbuilders is unable to be with us. Also, I am sure we welcome the opportunity of having with us on an occasion such as this the representatives of various administrative departments of His Majesty's Government.

THE TRAINING AND UTILISATION OF LABOUR, INCLUDING WOMEN LABOUR

*By C. Wollaston**

IN order that the full significance of the above subject can be thoroughly appreciated, it would, perhaps, be advisable to view the difficulties which arise. From the conventional apprenticeship and private methods in individual works, the training of labour has been forced by circumstances to pass, in a short time, through three stages.

Training.

In the first instance, a scheme was designed to equip and distribute certain types of workers in other trades, from distressed and derelict areas. Secondly, the industrial demands of the war effort immediately called for a greatly increased and continuous supply of persons who could take their place as trained workers with a minimum of delay. Faced with this problem the obvious course was to record the governing factors and endeavour to evolve an arrangement which would satisfy them. The position was met by selecting applicants at the Labour Exchanges and training them either at instructional centres established for the purpose or, where facilities were available, at the local technical colleges. The fundamental principles of machine and bench work were incorporated in a series of graded exercises and every effort made to meet employers' particular requirements. The scheme had, however, the inherent disadvantage that the employer, whose co-operation was essential, could call for a trainee at short notice with the consequent dislocation of the classroom tuition which is a necessary supplement to the practical training. For example if, owing to the various stages of their studies, a class of twenty students have to receive individual instruction in engineering processes, drawing, and arithmetic, the work of the teacher is considerably increased and the result achieved greatly decreased. This fact was duly noted by the Ministry of Labour and, by wise planning, a considerable improvement has been effected. It must be remembered, however, that the paramount importance of the country's need may prevent the ideal, of taking a batch periodically, from being attained in every instance.

* This contribution was awarded the highest number of marks as the best essay for the Graduateship Examination, 1941.

Lastly, the Ministry of Labour scheme, the purpose of which was, primarily, to use the whole of the country's man power, has since been extended to the training of workers previously employed in trades which the national emergency has reduced in importance. The flexibility of this scheme has permitted the use of the best features of the original idea which was, not to create a number of machine minders or bench assemblers, but to impart a degree of skill which would enable the recipient to be adaptable within the limits of the training received. The questions then arose were the trainees: (*a*) To receive intensive training upon one particular type of work, e.g. a universal milling machine or upon the bench? (*b*) An all-round experience as a machinist upon milling, turning, shaping, planing, drilling, grinding, etc.? (c) A combination of (*b*) and bench work? Although local requirements must inevitably control the issue, it is to be regretted that of the latter scheme (*c*) now seems to predominate owing to the difficulty experienced by the employers in indicating their requirements, invaluable though the information would be to the training centres in avoiding any wasted effort.

Pamphlets and booklets giving details of the intensive training, etc., have been published rendering repetition unnecessary. The syllabus set out for the practical work has been carefully studied and prepared, adjustments being made according to the experience gained. The theoretical instruction is strictly confined to relevant workshop practice requirements, and information which supplies the answer to the many queries that arise.

It must be remembered that many of those trained, and still being trained, are skilled men from other trades. The salaries of some trainees greatly exceeded in peace time any remuneration they would receive as turners, tool makers, millers, or fitters, yet, in their enthusiasm, they now fail to grasp the basic necessity for completing each stage to specification instead of rushing the work through and hoping to rectify discrepancies afterwards. Another difficulty occurs when working upon a cylindrical component having various diameters of definite lengths which require leaving plus $^1/_{32}$ in. for finishing. The $^1/_{32}$ in. very often becomes accumulative and so increases the overall length by $\frac{1}{4}$ in. However, under continuous supervision and guidance, the cultivation of working in terms of precise measurement, the study of correct attitude and good habits, quick and easy movements without unnecessary motion, etc., create a progressive atmosphere which immediately results in producing well shaped raw material thoroughly tested and approved as likely to be efficient in service.

The instructors, who are specialists released from production, size up the trainees individually, note their natural talent, the reason

for any lack of progress, and bear in mind any past difficulties. By this means and conforming to certain standard principles, future development is built upon the solid basis of proved experience. A knowledge of the elements of productive processes, adaptability to the close confinement and busy environment of factory life, getting accustomed to standing for long periods, conforming to routine, shop rules and safety first precautions, association with new workmates, etc., reduce the disturbance to a minimum when the trainees take their place in industry.

Utilisation.

In the utilisation of labour to the best advantage the regional inspectors are an important link, acting in the capacity of a civilian liaison officer between the Labour Exchanges, training centres, and employers. Their task of solving the new problems of an unprecedented situation is an extremely hard one owing to the fluidity of supply and demand, which is naturally governed by priority, and calls for the exercise of foresight and judgment. The value of their investigations depends upon the extent that initiative and common sense are applied. The ideal method of utilisation would be to place all trainees for certain classes of bench and machine work upon "roughing out," leaving the finer limits and finish to be accomplished by skilled labour. The supply of skilled workers is now very limited and the demand made upon them is an equally important side of using their abilities to the full capacity. This is a challenge to ingenuity regarding the simplification of workshop operations and, in order to use the skilled men as a nucleus of "shift workers," a system of up-grading semi-skilled labour is now being instituted to supply the particular needs caused by the "breaking down" of skilled processes. Those engaged in industry realise the limitations imposed by the time factor upon training and are anxious to avoid placing trainees upon an unaccustomed class of work. Unfortunately, this is sometimes unavoidable and the trainee learns his new job under actual production conditions at the employer's establishment. In a recent instance, within the writer's knowledge, four men were immediately taught precision work upon vertical boring machines—a definite case of up-grading trainees. But the spirit of tolerance shown, especially when the work is a considerable distance from their home, is evidence that the trainees understand the magnitude of the country's task and the extreme importance to "get going."

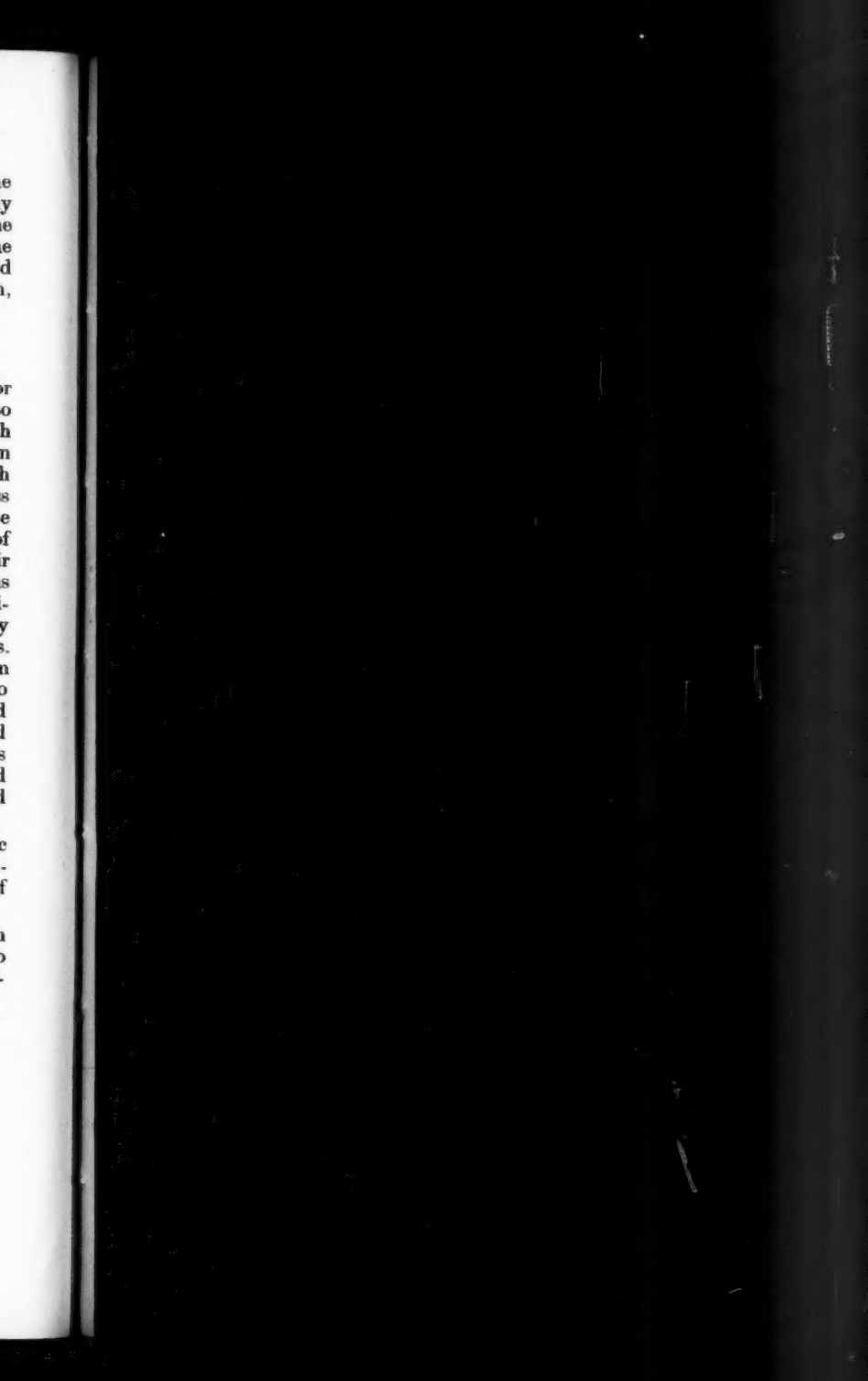
Dilution.

The original inhabitants of the workshops, who have been correctly termed the regular civilian "shock troops," have long since recognised the fact that their limitations were not inexhaustible

and very wisely agreed to the suggestion to dilute labour during the national emergency. This has entailed the suspension of many hard won trade union privileges, a temporary concession which the leaders recognise would become permanent if we lost the war. The additional help secured, in one particular instance, has enabled three eight shifts to be worked, replacing two of twelve hours each, with a proved 25% increase of output.

Women Trainees.

The employment of women trainees is not to be underrated or regarded as substitute labour, because manufacturers opposed to the idea have admitted their admiration for the efficiency with which jobs, once considered to be beyond their capacity, have been tackled by women. It has already been conceded that upon such operations as inspection and gauging, their patience, thoroughness and lightness of hand adapt them admirably to continuous accurate work. For machining in general they are unusually observant of small inconsistencies in the machines' performance, to which their attitude is rather exacting, causing them to fret at slight variations in the completed component. Once they have overcome the hesitancy consequent upon their greater care and acquired the necessary confidence and skill, they are temperamentally good machinists. The fatigue factor, likely to occur due to physical limitations, can be considerably reduced by selective grading from repetitive into more complicated stages, and if " snags " are foreseen and allowed for, some remarkable results can be achieved. A slightly lowered vise (raised floor not to be recommended owing to its dangerous nature) a smaller handled tool, size of shovel reduced, drills and their jig bushes marked in corresponding colours, a spring loaded tap wrench, etc., assist in overcoming certain deficiencies.

The most important point, however, appears to be the domestic one in the case of married women, especially mothers, and the maximum speed is required to deal with the urgent social question of children's welfare if absenteeism is to be abolished.

In conclusion, although naturally every employer and craftsman has his own idea upon the subject, the training scheme has much to recommend it as a basis for further use during the post-war reconstruction period.